VAX 7000
Pocket Service Guide

Order Number EK–7000A–PG.001

This manual is intended for Digital service engineers. It supplies easy-to-access key information on VAX 7000 systems.

digital equipment corporation
maynard, massachusetts

First Printing, September 1992

DEC	OpenVMS	VAXBI
DEC LANcontroller	PDP	VAXcluster
DECnet	ULTRIX	VAXELN
DECUS	UNIBUS	XMI
DWMVA	VAX	digital

Contents

Chapter 4 Diagnostics

Chapter 5 FRU Locations

Chapter 6 Controls and Indicators

Chapter 7 Restoring Corrupted ROMs

Chapter 8 System Errors

Examples

Figures

Tables

Preface

Intended Audience

This manual is written for the Digital service engineer.

Document Structure

This manual has eight chapters:

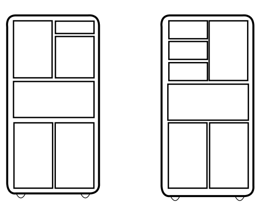
- **Chapter 1, Registers,** lists the registers in this system and provides an illustration of each.
- **Chapter 2, Addressing,** provides information on address space lay-out, addresses, and device types.
- **Chapter 3, Console,** contains a list of the console commands, syntax, and error messages.
- **Chapter 4, Diagnostics,** shows examples of running diagnostics on adapters and device controllers.
- **Chapter 5, FRU Locations,** identifies the field-replaceable units in the platform.
- **Chapter 6, Controls and Indicators,** discusses the controls and in-dicators on various components of the system.
- **Chapter 7, Restoring Corrupted ROMs,** provides instructions for restoring corrupted EEPROMs and for updating corrupted firmware.
- **Chapter 8, System Errors,** includes the machine check frame and the system parse trees.

Conventions Used in This Document

The text shown in command syntax uses these conventions:

- **Bold text** indicates elements to be typed at the terminal.
- Brackets ([]) indicate that an element is optional.
- Braces ({}) indicate a choice from the enclosed list.
- Angle brackets (<>) indicate that the enclosed text is not a literal depiction of the element but instead a reference to the kind of item that can appear in that position.

The icons shown below are used in illustrations for designating part placement in the system described. A shaded area in the icon shows the location of the component or part being discussed.



Front   Rear

Document Titles

Table 1 lists the books in the VAX 7000 documentation set. Table 2 lists other documents that you may find useful.

Table 1 VAX 7000 Documentation

Title	Order Number
Installation Kit	EK–7000A–DK
Site Preparation Guide	EK–7000A–SP
Installation Guide	EK–700EA–IN
Hardware User Information Kit	EK–7001A–DK
Operations Manual	EK–7000A–OP
Basic Troubleshooting	EK–7000A–TS

Table 1 VAX 7000 Documentation (Continued)

Title	Order Number
Service Information Kit	EK–7002A–DK
Pocket Service Guide	EK–7000A–PG
Advanced Troubleshooting	EK–7001A–TS
Platform Service Manual	EK–7000A–SV
System Service Manual	EK–7002A–SV
Reference Manuals	
Console Reference Manual	EK–70C0A–TM
KA7AA CPU Technical Manual	EK–KA7AA–TM
MS7AA Technical Manual	EK–MS7AA–TM
I/O System Technical Manual	EK–70I0A–TM
Platform Technical Manual	EK–7000A–TM
Upgrade Manuals	
KA7AA CPU Installation Guide	EK–KA7AA–IN
MS7AA Memory Installation Guide	EK–MS7AA–IN
DWLMA XMI PIU Installation Guide	EK–DWLMA–IN
H7237 Battery PIU Installation Guide	EK–H7237–IN
BA654 Disk PIU Installation Guide	EK–BA654–IN
DWMBB VAXBI PIU Installation Guide	EK–DWMBB–IN
Removable Media Installation Guide	EK–TFRRD–IN

Table 2 Related Documents

Title	Order Number
General Site Preparation	
Site Environmental Preparation Guide	EK–CSEPG–MA
System I/O Options	
CIXCD Interface User Guide	EK–CIXCD–UG
DEC FDDIcontroller 400 Installation/Problem Solving	EK–DEMFA–IP
DEC LANcontroller 400 Installation Guide	EK–DEMNA–IN
DEC LANcontroller 400 Technical Manual	EK–DEMNA–TM
DSSI VAXcluster Installation and Troubleshooting Manual	EK–410AA–MG
InfoServer 150 Installation and Owner's Guide	EK–INFSV–OM
KFMSA Module Installation and User Manual	EK–KFMSA–IM
KFMSA Module Service Guide	EK–KFMSA–SV
RF Series Integrated Storage Element User Guide	EK–RF72D–UG
TF85 Cartridge Tape Subsystem Owner's Manual	EK–OTF85–OM
Operating System Manuals	
VMS Upgrade and Installation Supplement: VAX 7000–600 and VAX 10000–600 Series	AA–PRAHA–TE
VMS Network Control Program Manual	AA–LA50A–TE
VAXclusters and Networking	
HSC Installation Manual	EK–HSCMN–IN
SC008 Star Coupler User's Guide	EK–SC008–UG
VAX Volume Shadowing Manual	AA–PBTVA–TE
Peripherals	
Installing and Using the VT420 Video Terminal	EK–VT420–UG
LA75 Companion Printer Installation and User Guide	EK–LA75X–UG

Chapter 1

Registers

This chapter is a compilation of the major registers in components of the VAX 7000 system. Each section consists of a list of the registers in the component including register name, mnemonic, and address and illustrations of the major registers. Sections include:

- KA7AA Registers
  - LSB Required Registers
  - CPU-Specific Registers
  - Internal Processor Registers
  - Gbus Registers
- MS7AA Registers
- I/O Port Registers
- DWLMA Registers
  - LSB Registers
  - XMI Registers

1.1 KA7AA Registers

Table 1-1 LSB Required Registers

Mnemonic	Register Name	Byte Offset
LDEV	Device	BB [1] + 0000
LBER	Bus Error	BB + 0040
LCNR	Configuration	BB + 0080
LMMR0	Memory Mapping 0	BB + 0200
LMMR1	Memory Mapping 1	BB + 0240
LMMR2	Memory Mapping 2	BB + 0280
LMMR3	Memory Mapping 3	BB + 02C0
LMMR4	Memory Mapping 4	BB + 0300
LMMR5	Memory Mapping 5	BB + 0340
LMMR6	Memory Mapping 6	BB + 0380
LMMR7	Memory Mapping 7	BB + 03C0
LBESR0	Bus Error Syndrome 0	BB + 0600
LBESR1	Bus Error Syndrome 1	BB + 0640
LBESR2	Bus Error Syndrome 2	BB + 0680
LBESR3	Bus Error Syndrome 3	BB + 06C0
LBECR0	Bus Error Command 0	BB + 0700
LBECR1	Bus Error Command 1	BB + 0740
LIOINTR	I/O Interrupt	BSB[2] + 0000
LIPINTR	Interprocessor Interrupt	BSB + 0040

[1] BB is the node space base address of the CPU module in hex.
[2] BSB is the broadcast space base address in hex.

Figure 1-1 LDEV — Device Register

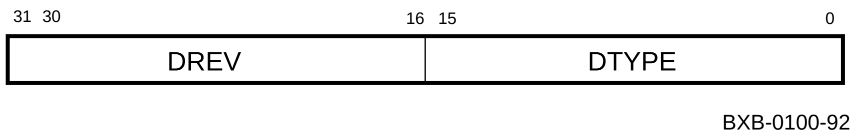


Figure 1-2 LBER — Bus Error Register

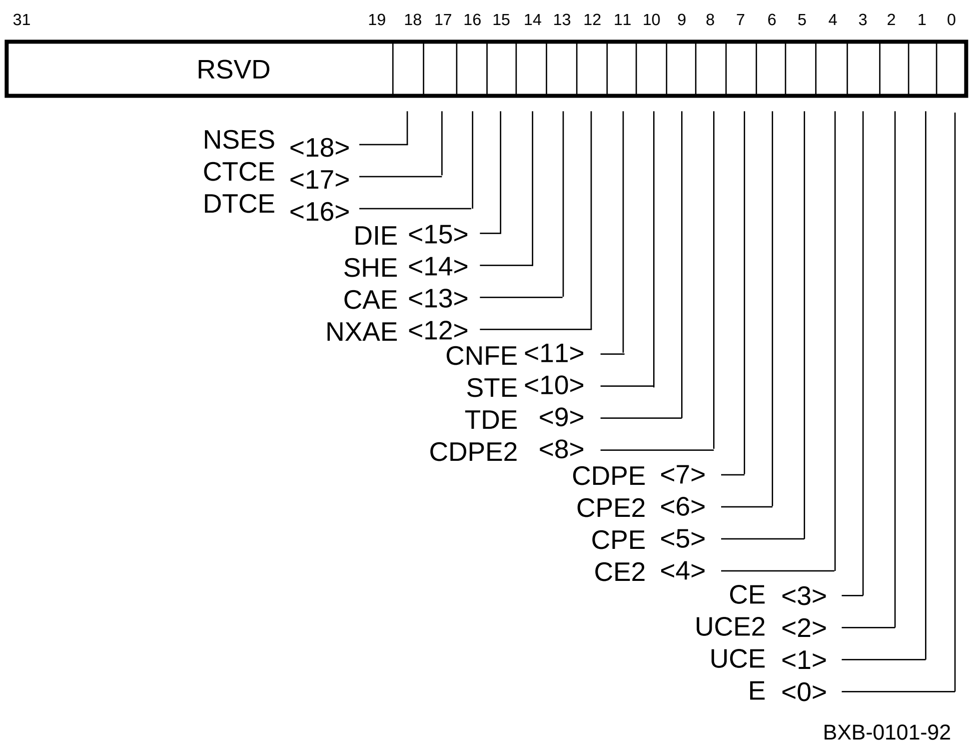


Figure 1-3 LCNR — Configuration Register



Figure 1-4 LMMR0–7 — Memory Mapping Registers

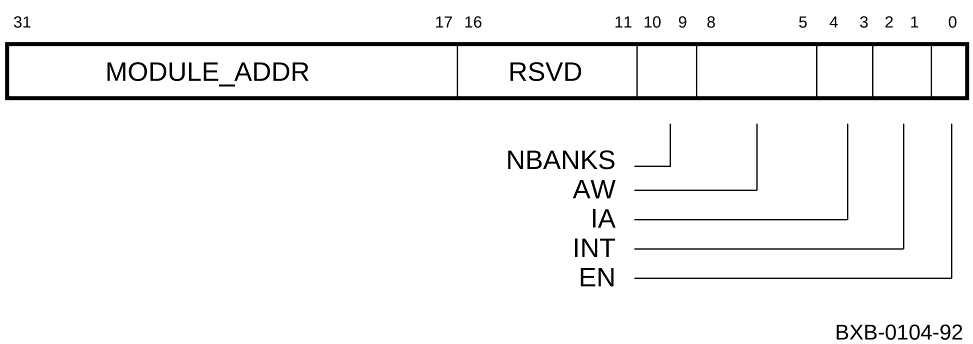


Figure 1-5 LBESR0–3 — Bus Error Syndrome Registers

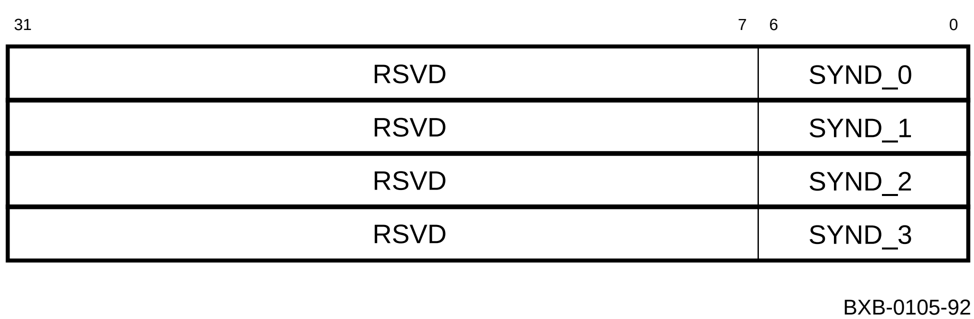


Figure 1-6 LBECR0–1 — Bus Error Command Registers

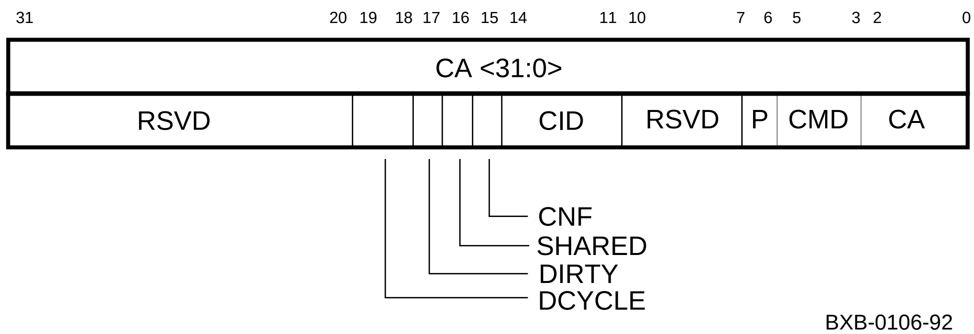


Figure 1-7 LIOINTR — I/O Interrupt Register

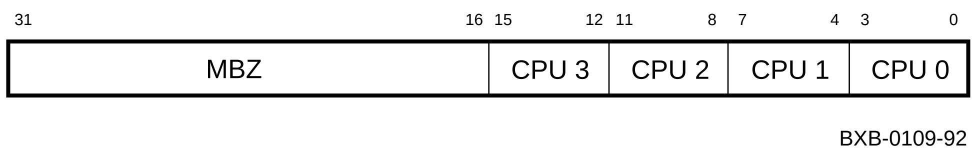


Figure 1-8 LIPINTR — Interprocessor Interrupt Register

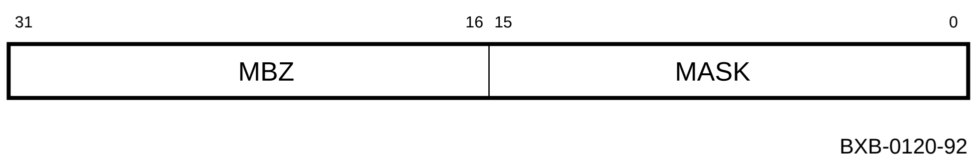


Table 1-2 KA7AA-Specific Registers

Mnemonic	Register Name	Byte Offset
LMODE	Mode	BB + C00
LMERR	Module Error	BB + C40
LLOCK	Lock Address	BB + C80
LDIAG	Diagnostic Control	BB + D00
LTAGA	Tag Address	BB + D40
LTAGW	Tag Write Data	BB + D80
LCON	Console Communication	BB + E00 BB + E40
LPERF	Performance Counter Control	BB + F00
LCNTR	Performance Counter	BB + F40 BB + F80
LMISSADDR	Last Miss Address	BB + FC0

Figure 1-9 LMODE — Mode Register

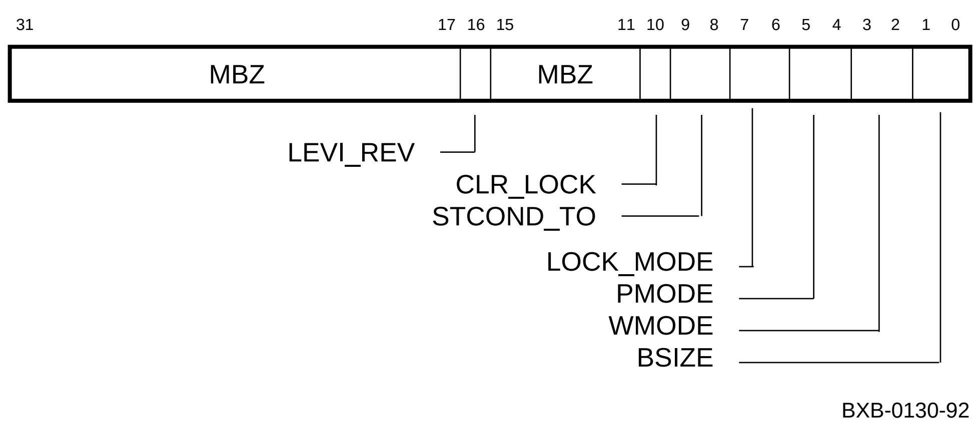


Figure 1-10 LMERR — Module Error Register

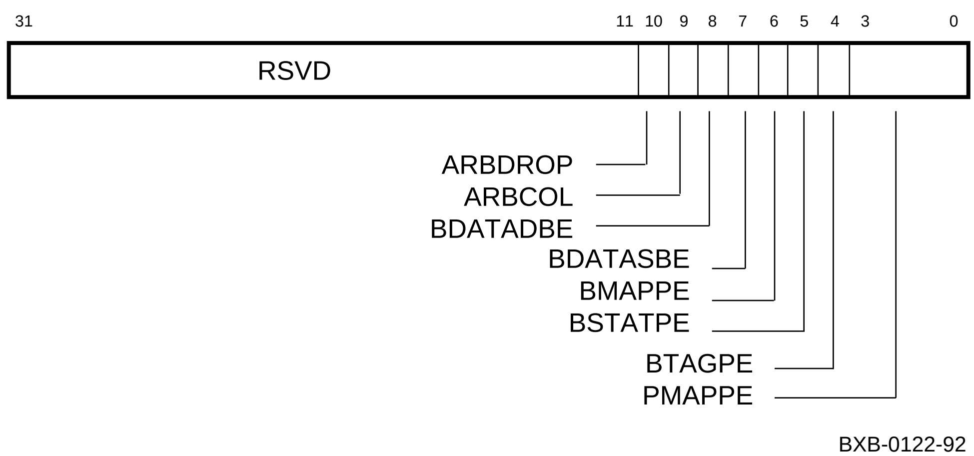


Figure 1-11 LLOCK — Lock Address Register

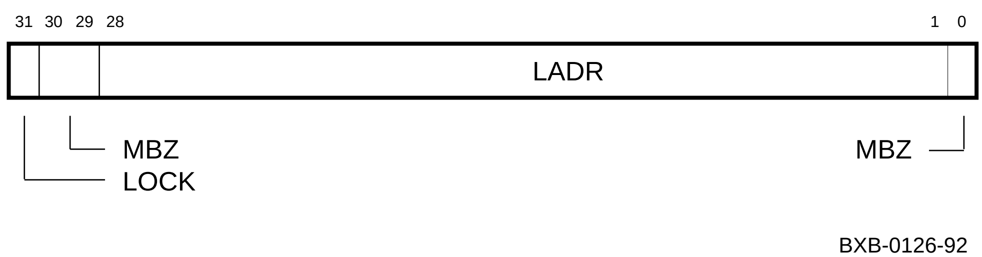


Figure 1-12   LDIAG — Diagnostic Control Register

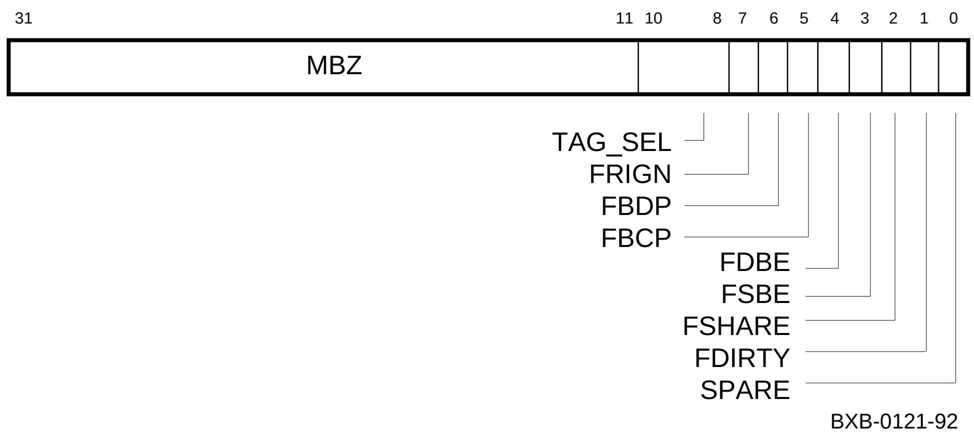


Figure 1-13   LTAGA — Tag Address Register

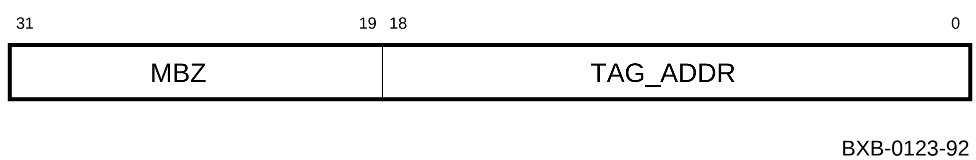


Figure 1-14   LTAGW — Tag Write Data Register

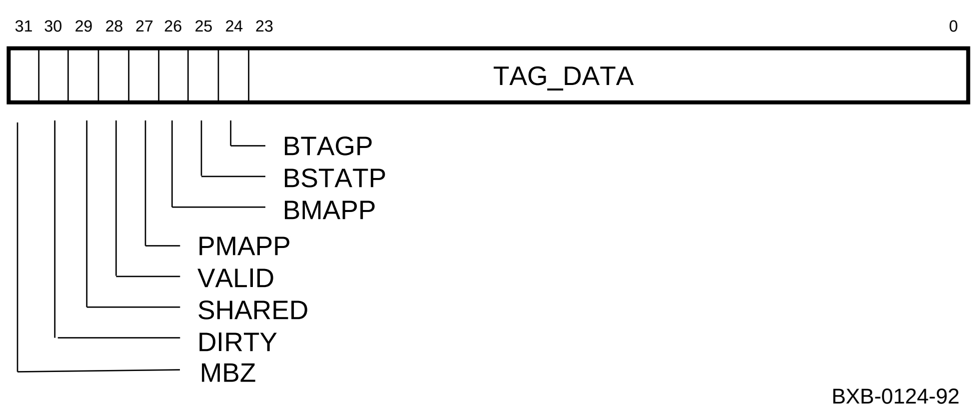


Figure 1-15 LCON — Console Communication Registers

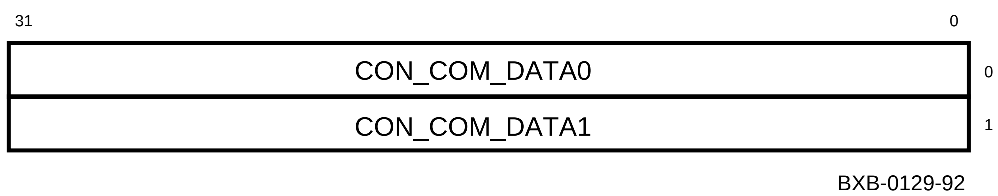


Figure 1-16 LPERF — Performance Counter Control Register

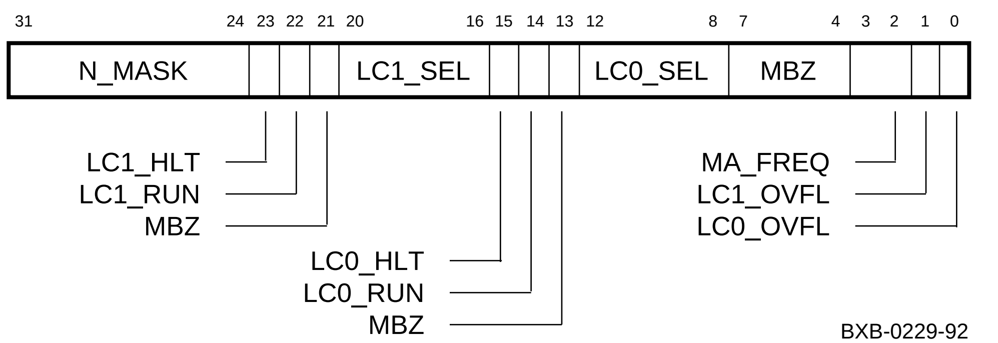


Figure 1-17 LCNTR — Performance Counter Registers

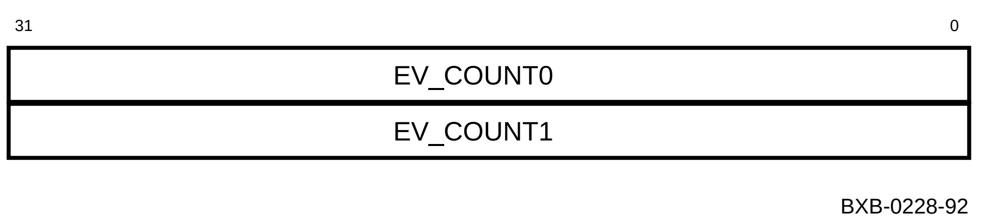


Figure 1-18 LMISSADDR — Last Miss Address Register



Table 1-3 KA7AA Internal Processor Registers

Mnemonic	Register Name	Address Dec	Address Hex	Type
KSP	Kernel Stack Pointer	0	0	R/W
ESP	Executive Stack Pointer	1	1	R/W
SSP	Supervisor Stack Pointer	2	2	R/W
USP	User Stack Pointer	3	3	R/W
ISP	Interrupt Stack Pointer	4	4	R/W
P0BR	P0 Base	8	8	R/W
P0LR	P0 Length	9	9	R/W
P1BR	P1 Base	10	A	R/W
P1LR	P1 Length	11	B	R/W
SBR	System Base	12	C	R/W
SLR	System Length	13	D	R/W
CPUID	CPU Identification [1]	14	E	R/W
PCBB	Process Control Block Base	16	10	R/W
SCBB	System Control Block Base	17	11	R/W
IPL	Interrupt Priority Level [1]	18	12	R/W
ASTLVL	AST Level [1]	19	13	R/W
SIRR	Software Interrupt Request	20	14	WO
SISR	Software Interrupt Summary [1]	21	15	R/W
ICCS	Interval Clock Control/Status [1]	24	18	R/W
NICR	Next Interval Count	25	19	WO
ICR	Interval Count	26	1A	RO
TODR	Time-of-Day	27	1B	R/W
MCESR	Machine Check Error Summary	38	26	WO
SAVPC	Console Saved PC	42	2A	RO
SAVPSL	Console Saved PSL	43	2B	RO

[1] Initialized on reset.

Table 1-3 KA7AA Internal Processor Registers (Continued)

Mnemonic	Register Name	Address Dec	Address Hex	Type
MAPEN	Memory Management Enable [1]	56	38	R/W
TBIA	Translation Buffer Invalidate All	57	39	WO
TBIS	Translation Buffer Invalidate Single	58	3A	WO
PME	Performance Monitor Enable [1]	61	3D	R/W
SID	System Identification	62	3E	RO
TBCHK	Translation Buffer Check	63	3F	WO
LMBOX	Mailbox	121	79	WO
INTSYS	Interrupt System Status [2]	122	7A	R/W
PMFCNT	Performance Monitoring Facility Count	123	7B	R/W
PCSCR	Patchable Control Store Control[2]	124	7C	R/W
ECR	Ebox Control	125	7D	R/W
MTBTAG	Mbox TB Tag Fill [2]	126	7E	WO
MTBPTE	Mbox TB PTE Fill [2]	127	7F	WO
BIU_CTL	BIU Control	160	A0	WO
DIAG_CTL	Diagnostic Control	161	A1	WO
BC_TAG	B-Cache Error Tag	162	A2	RO
BIU_STAT	BIU Status	164	A4	W1C
BIU_ADDR	BIU Address	166	A6	RO
FILL_SYN	Fill Syndrome	168	A8	RO
FILL_ADDR	Fill Address	170	AA	RO
IPR_STR_COND	STxC Pass Fail/CEFSTS	172	AC	R/W

[1] Initialized on reset.
[2] Testability and diagnostic use only; not for software use in normal operation.

Table 1-3 KA7AA Internal Processor Registers (Continued)

Mnemonic	Register Name	Address Dec	Address Hex	Type
BCDECC	Software ECC	174	AE	WO
CHALT	Console Halt	176	B0	R/W
SIO	Serial I/O	178	B2	R/W
SOE_IE	SROM_OE_Serial I.E.	180	B4	R/W
QW_PACK	Pack I/O to QW	184	B8	WO
CLR_IO_ PACK	Clear QW I/O Pack	185	B9	WO
VMAR	VIC Memory Address	208	D0	R/W
VTAG	VIC Tag	209	D1	R/W
VDATA	VIC Data	210	D2	R/W
ICSR	Ibox Control and Status	211	D3	R/W
BPCR	Ibox Branch Prediction Control[2]	212	D4	R/W
BPC	Ibox Backup PC	214	D6	RO
BPCUNW	Ibox Backup PC with RLOG Unwind [3]	215	D7	RO
MP0BR	Mbox P0 Base [2]	224	E0	R/W
MP0LR	Mbox P0 Length [2]	225	E1	R/W
MP1BR	Mbox P1 Base [2]	226	E2	R/W
MP1LR	Mbox P1 Length [2]	227	E3	R/W
MSBR	Mbox System Base [2]	228	E4	R/W
MSLR	Mbox System Length [2]	229	E5	R/W
MMAPEN	Mbox Memory Management Enable [2]	230	E6	R/W
PAMODE	Physical Address Mode	231	E7	R/W
MMEADR	Memory Management Exception Address	232	E8	RO

[2] Testability and diagnostic use only; not for software use in normal operation.
[3] Chip use only; not for software use.

Table 1-3 KA7AA Internal Processor Registers (Continued)

Mnemonic	Register Name	Address Dec	Address Hex	Type
MMEPTE	Memory Management Exception PTE Address	233	E9	RO
MMESTS	Memory Management Exception Status	234	EA	RO
TBADR	Translation Buffer Parity Address	236	EC	RO
TBSTS	Translation Buffer Parity Status	237	ED	R/W
PCADR	P-Cache Parity Address	242	F2	RO
PCSTS	P-Cache Status	244	F4	R/W
PCCTL	P-Cache Control	248	F8	R/W

Figure 1-19 ICCS — Interval Clock Control and Status Register

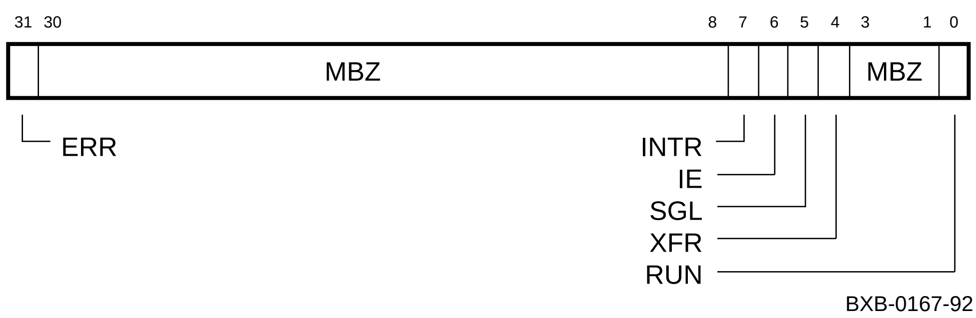


Figure 1-20 NICR — Next Interval Count Register

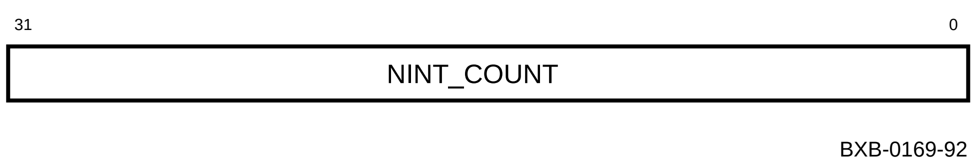


Figure 1-21 ICR — Interval Count Register

31 ... 0
INT_COUNT

BXB-0168-92

Figure 1-22 TODR — Time-of-Day Register

31 ... 0
TOD

BXB-0166-92

Figure 1-23 MCESR — Machine Check Error Summary Register

31 ... 0
MCESR

BXB-0236-92

Figure 1-24 SID — System Identification Register

31 ... 24	23 ... 16	15 ... 8	7 ... 0
CPU_TYPE	0 0 0 0 0 0 0 0	MIC_OPTIONS	MIC_REV

BXB-0180-92

Figure 1-25 PCSCR — Patchable Control Store Control Register

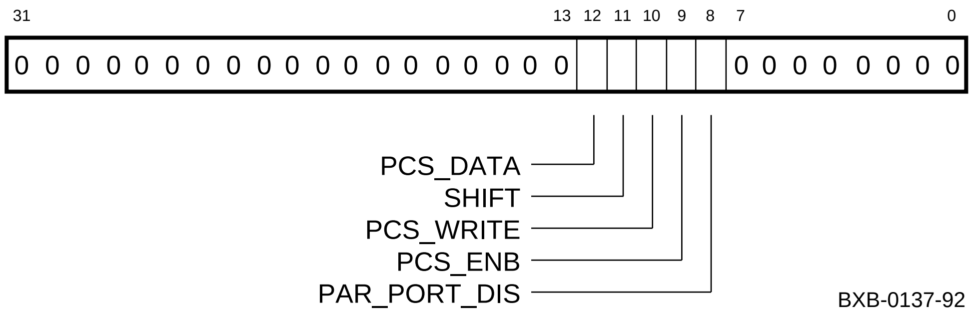


Figure 1-26 ECR — Ebox Control Register

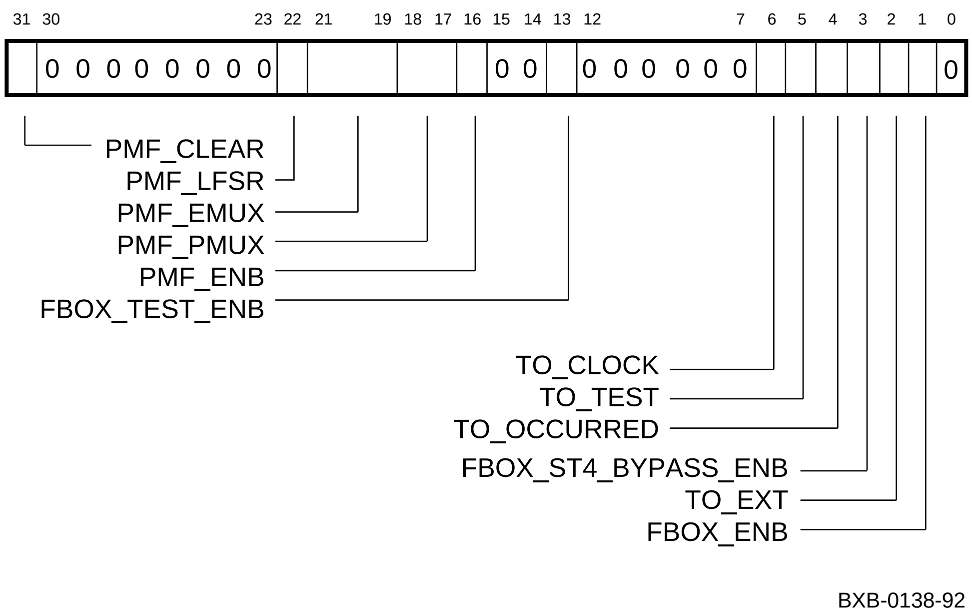


Figure 1-27 BIU_CTL — BIU Control Register

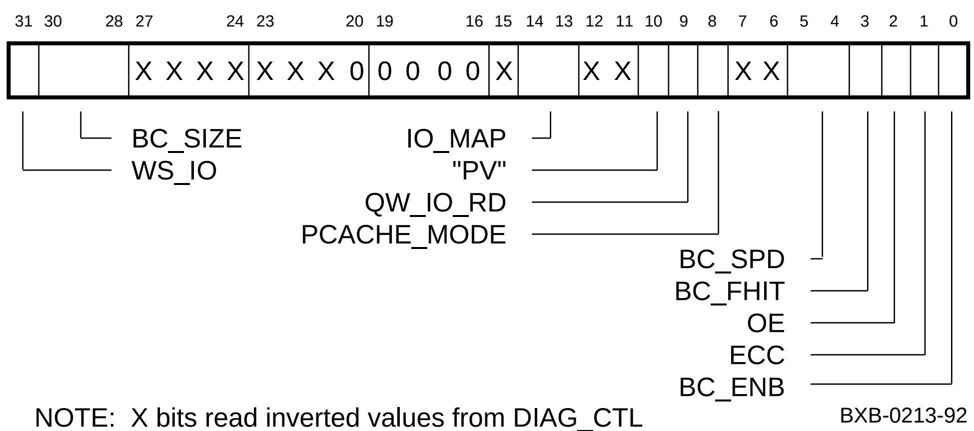


Figure 1-28 DIAG_CTL — Diagnostic Control Register

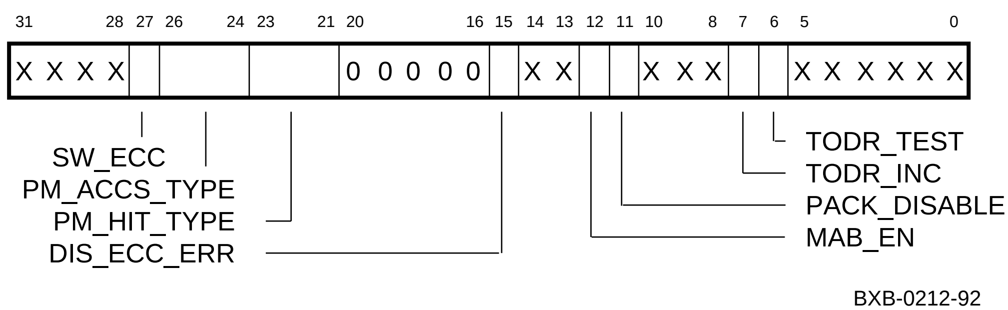


Figure 1-29 BIU_STAT — BIU Status Register

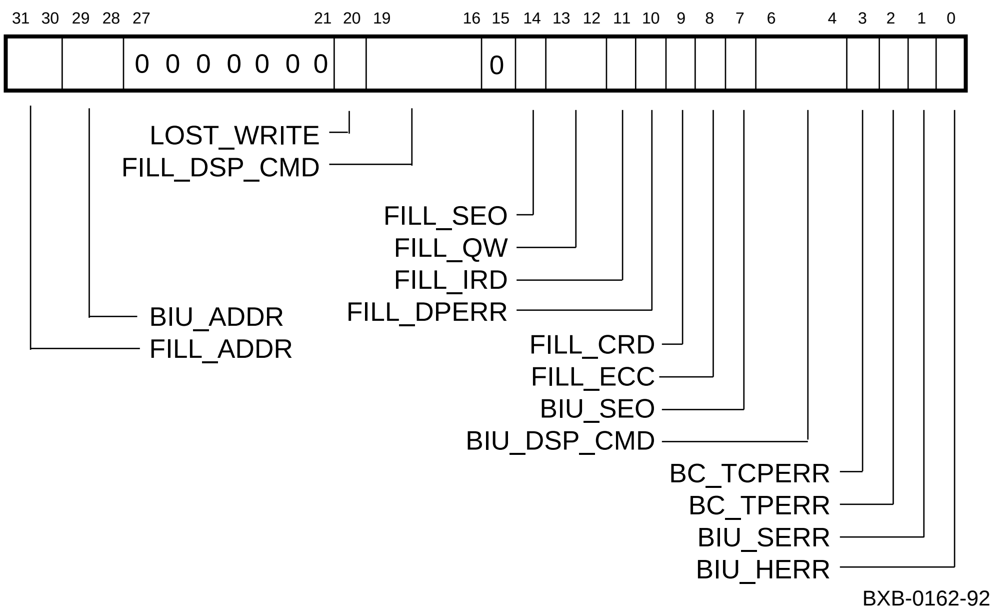


Figure 1-30 BIU_ADDR — BIU Address Register

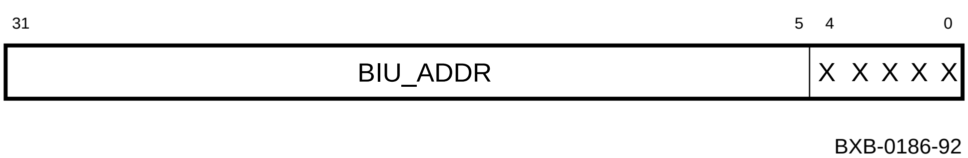


Figure 1-31 FILL_SYND — Fill Syndrome Register

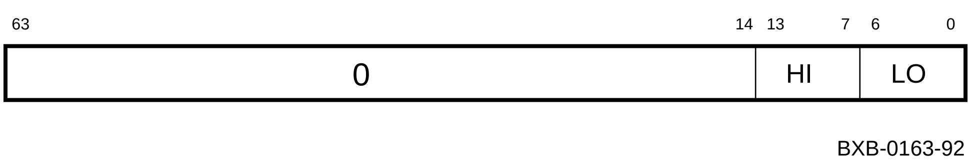


Figure 1-32 FILL_ADDR — Fill Address Register

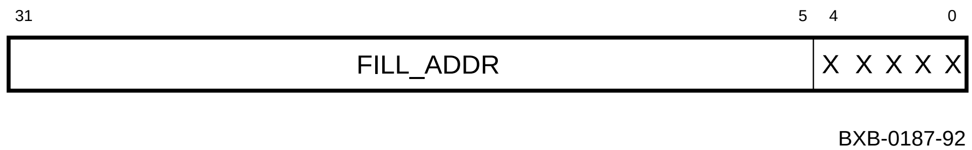


Figure 1-33 CHALT — Console Halt Register

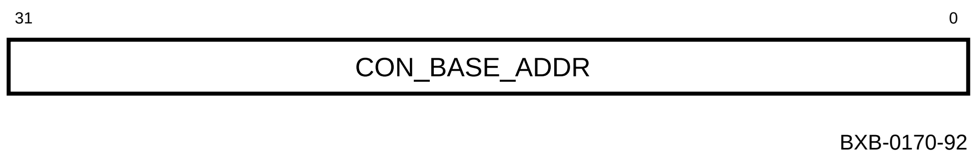


Figure 1-34 VMAR — VIC Memory Address Register

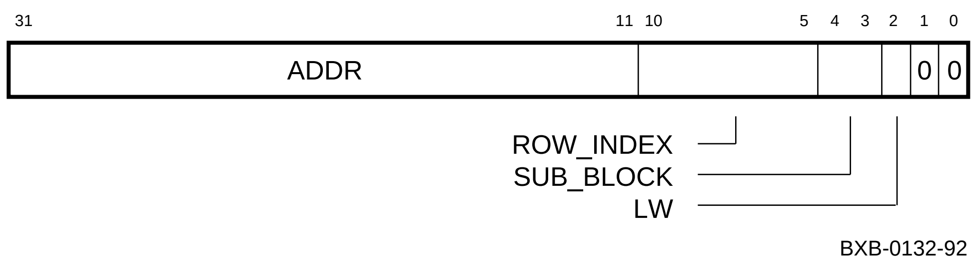


Figure 1-35 VTAG — VIC Tag Register

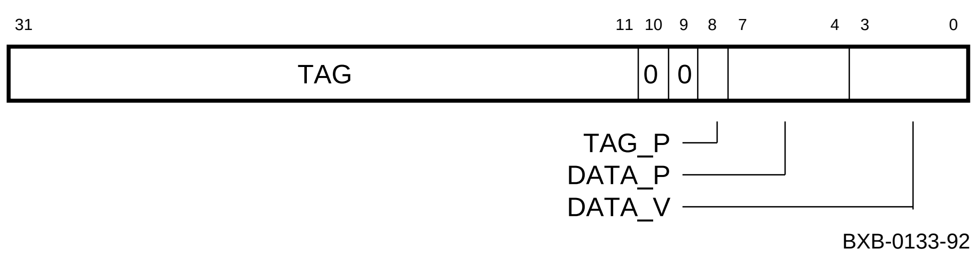


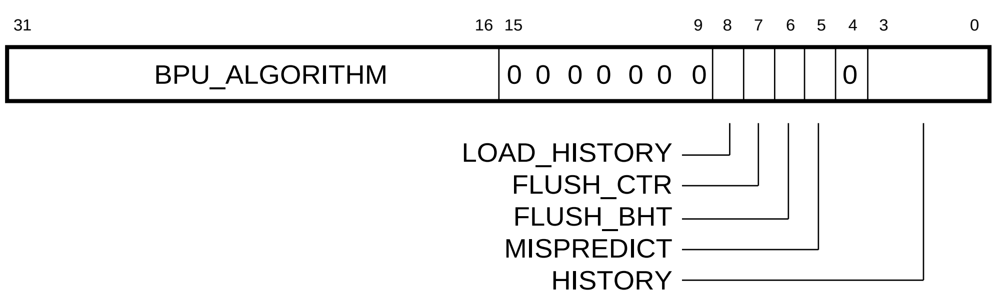
Figure 1-36 VDATA — VIC Data Register



Figure 1-37 ICSR — Ibox Control and Status Register



Figure 1-38 BPCR — Ibox Branch Prediction Control Register



As part of the power-up sequence, the microcode will write FECA0000, which is the following bit pattern:

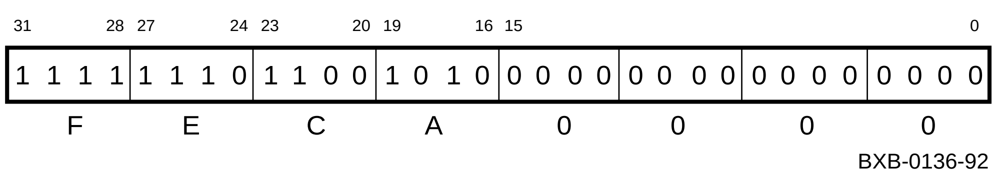
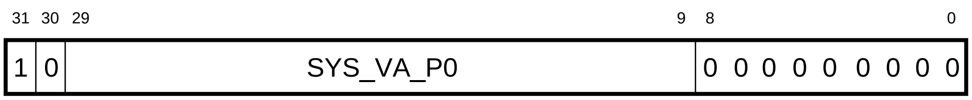
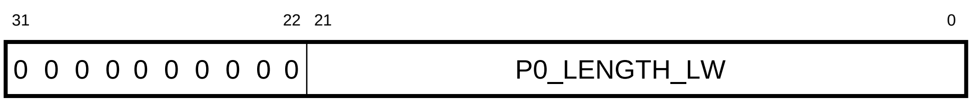


Figure 1-39 MP0BR — Mbox P0 Base Register



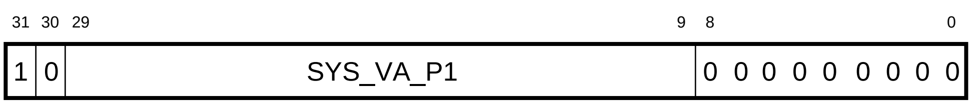
BXB-0139-92

Figure 1-40 MP0LR — Mbox P0 Length Register



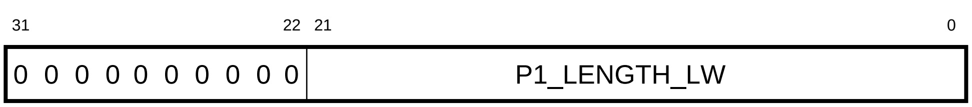
BXB-0140-92

Figure 1-41 MP1BR — Mbox P1 Base Register



BXB-0141-92

Figure 1-42 MP1LR — Mbox P1 Length Register



BXB-0142-92

Figure 1-43 MSBR — Mbox System Base Register

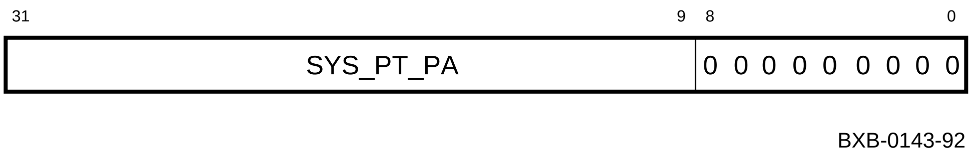


Figure 1-44 MSLR — Mbox System Length Register

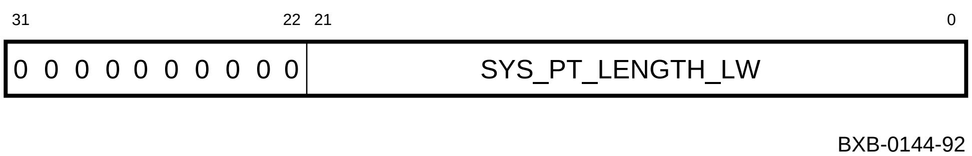


Figure 1-45 MMAPEN — Mbox Memory Management Enable Register

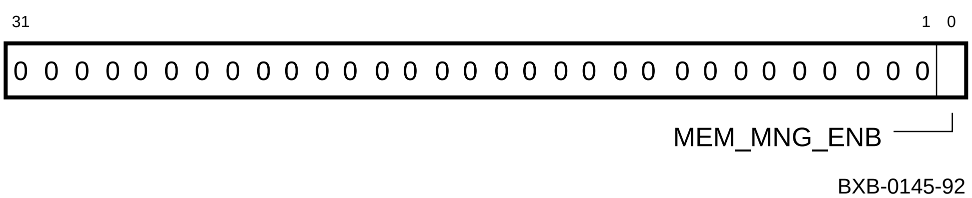


Figure 1-46 PAMODE — Physical Address Mode Register

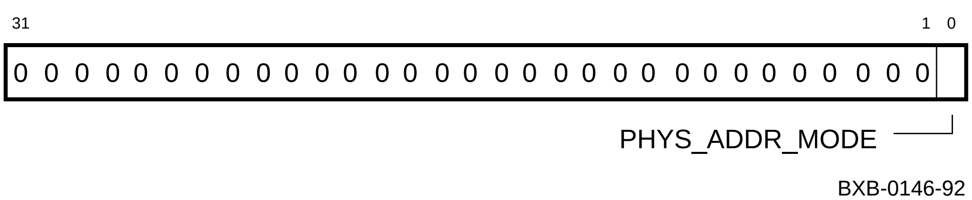


Figure 1-47 MMEADR — Memory Management Exception Address Register



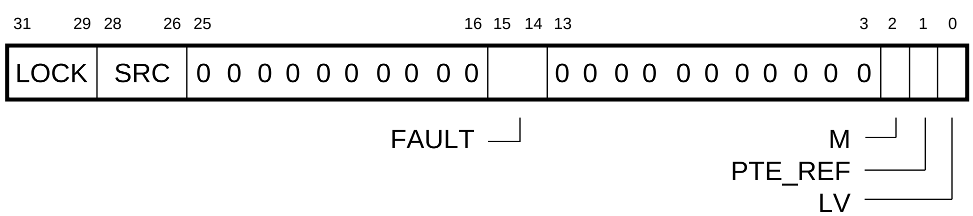
BXB-0147-92

Figure 1-48 MMEPTE — Memory Management Exception PTE Address Register



BXB-0148-92

Figure 1-49 MMESTS — Memory Management Exception Status Register



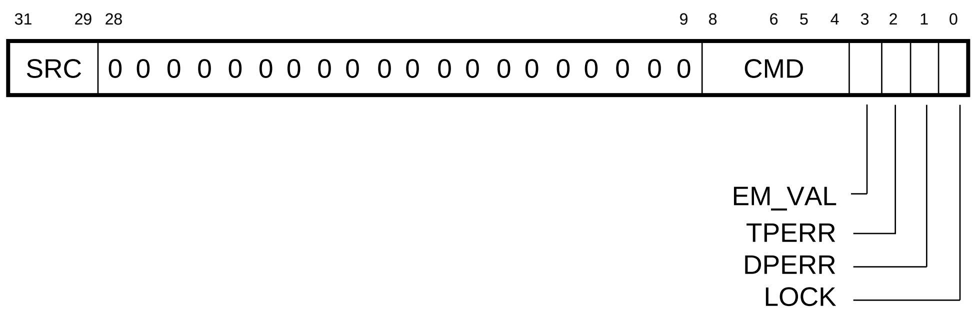
BXB-0149-92

Figure 1-50 TBADR — Translation Buffer Parity Address Register



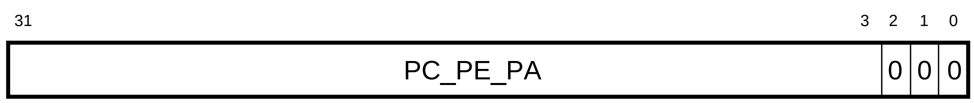
BXB-0150-92

Figure 1-51 TBSTS — Translation Buffer Parity Status Register



BXB-0151-92

Figure 1-52 PCADR — P-Cache Parity Address Register



BXB-0152-92

Figure 1-53 PCSTS — P-Cache Status Register

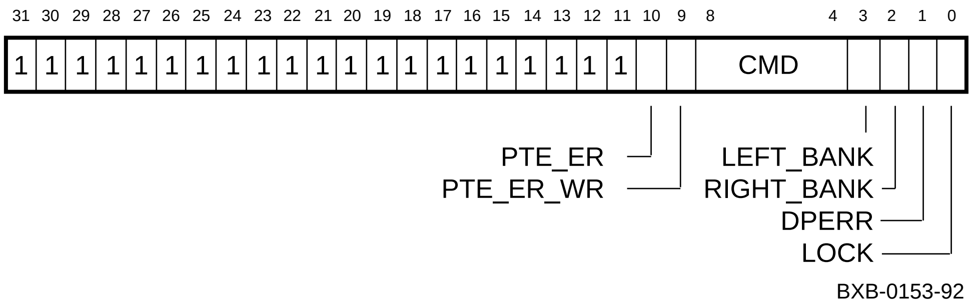


Figure 1-54 PCCTL — P-Cache Control Register

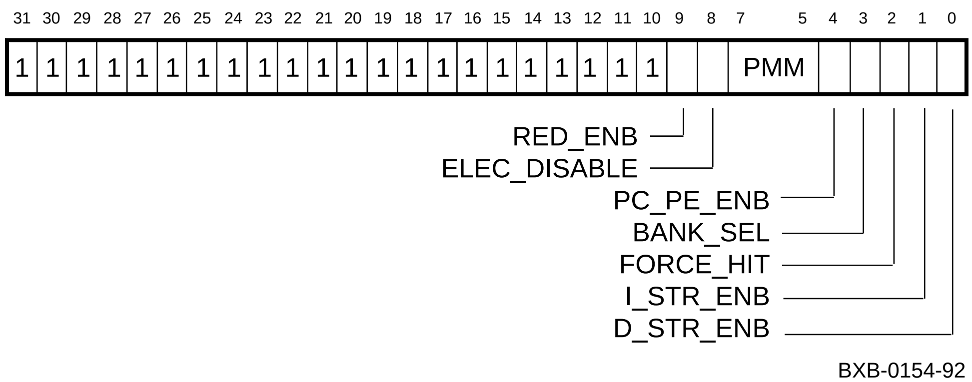


Table 1-4 Gbus Registers

Register	Address
Gbus$WHAMI	F700 0000
Gbus$LEDs	F700 0040
Gbus$PMask	F700 0800
Gbus$Intr	F700 00C0
Gbus$Halt	F700 0100
Gbus$LSBRST	F700 0140
Gbus$Misc	F700 0180
Gbus$RMode_ENA	F780 0000

1.2 MS7AA Registers

Table 1-5 MS7AA Registers

Mnemonic	Register Name	Byte Offset
LDEV	Device	BB + 0000
LBER	Bus Error	BB + 0040
LCNR	Configuration	BB + 0080
IBR	Information Base Repair	BB + 00C0
LBESR0	Bus Error Syndrome 0	BB + 0600
LBESR1	Bus Error Syndrome 1	BB + 0640
LBESR2	Bus Error Syndrome 2	BB + 0680
LBESR3	Bus Error Syndrome 3	BB + 06C0
LBECR0	Bus Error Command 0	BB + 0700
LBECR1	Bus Error Command 1	BB + 0740
MCR	Memory Configuration	BB + 2000
AMR	Address Mapping	BB + 2040
MSTR0	Memory Self-Test 0	BB + 2080
MSTR1	Memory Self-Test 1	BB + 20C0
FADR	Failing Address	BB + 2100
MERA	Memory Error A	BB + 2140
MSYNDA	Memory Syndrome A	BB + 2180
MDRA	Memory Diagnostic A	BB + 21C0
MCBSA	Memory Check Bit Substitute A	BB + 2200
MERB	Memory Error B	BB + 4140
MSYNDB	Memory Syndrome B	BB + 4180
MDRB	Memory Diagnostic B	BB + 41C0
MCBSB	Memory Check Bit Substitute B	BB + 4200

Figure 1-55 LDEV — Device Register

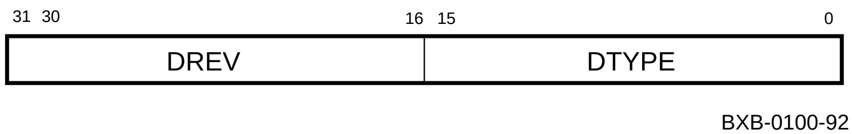


Figure 1-56 LBER — Bus Error Register

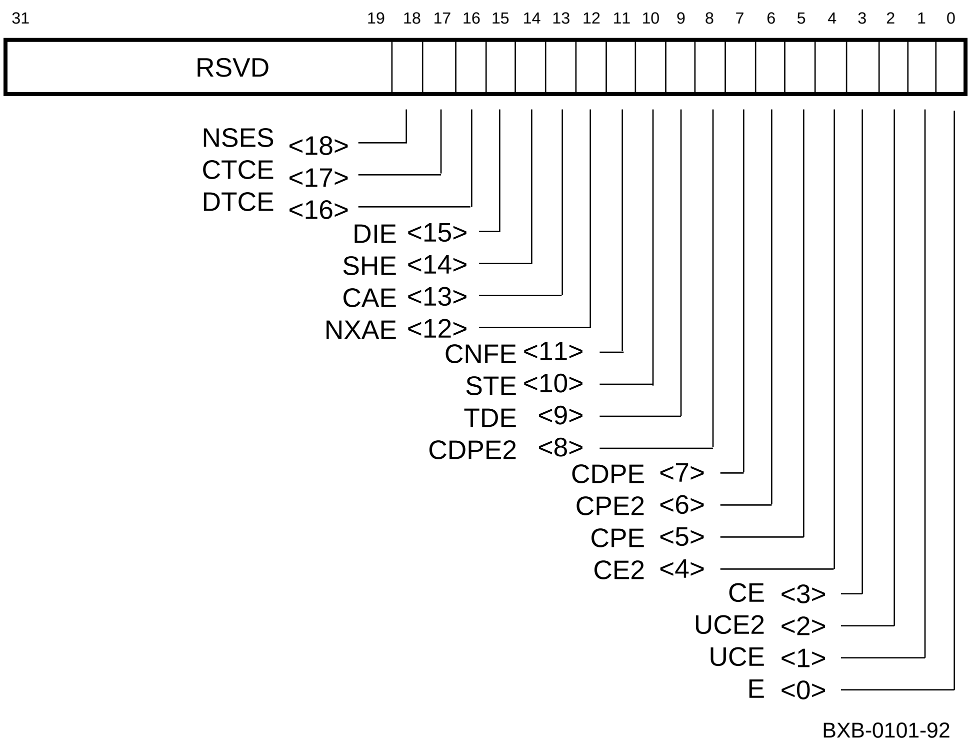


Figure 1-57 LCNR — Configuration Register

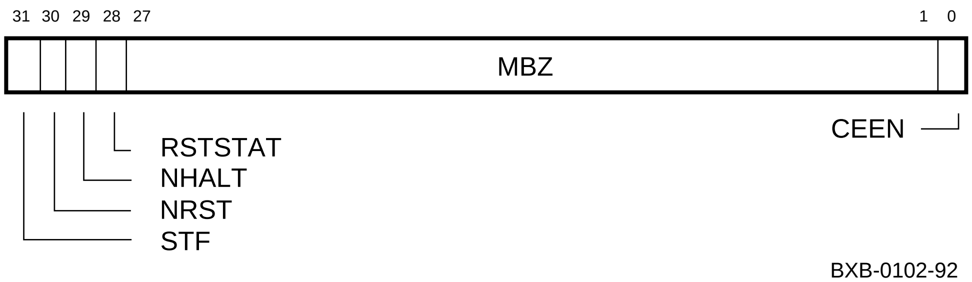


Figure 1-58 IBR — Information Base Repair Register

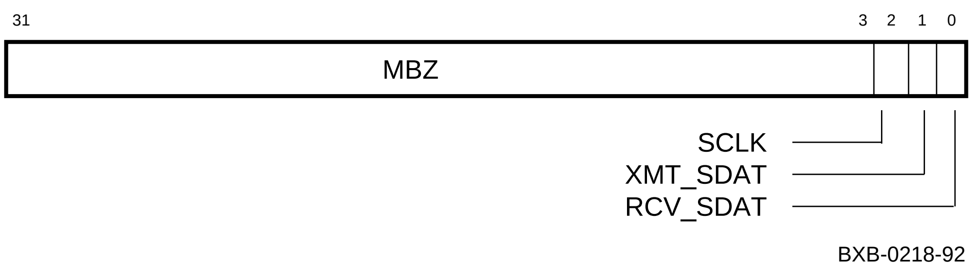


Figure 1-59 LBESR0–3 — Bus Error Syndrome Registers

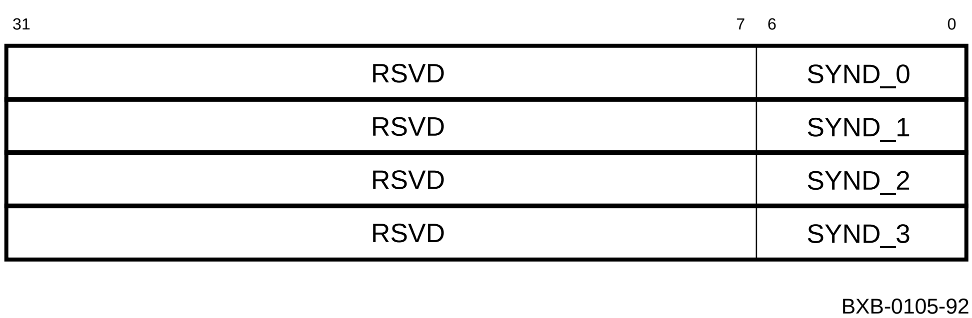


Figure 1-60 LBECR0–1 — Bus Error Command Registers

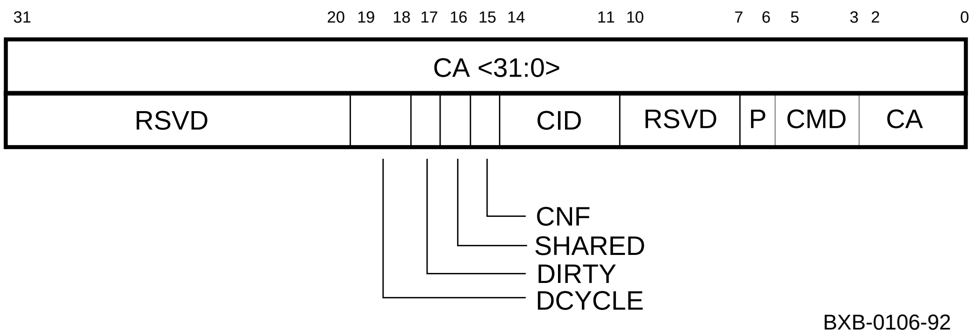


Figure 1-61 MCR — Memory Configuration Register

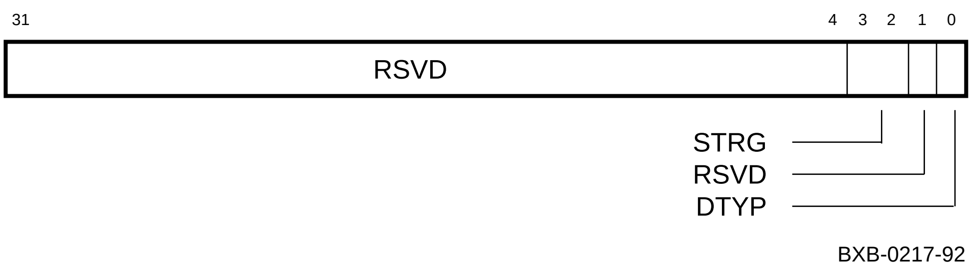


Figure 1-62 AMR — Address Mapping Register

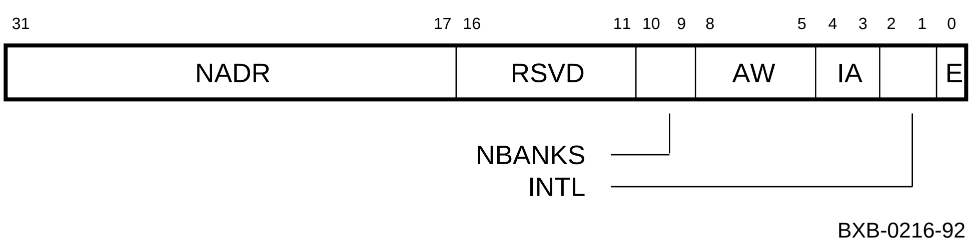
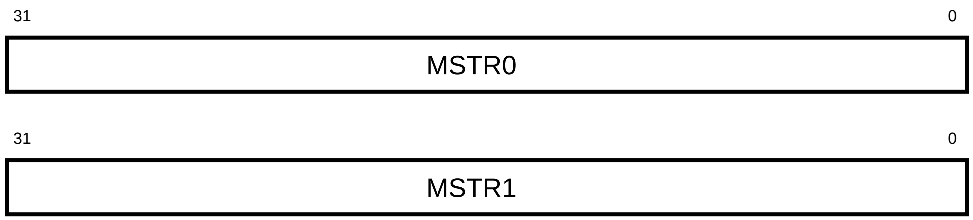


Figure 1-63 MSTR0–1 — Memory Self-Test Registers



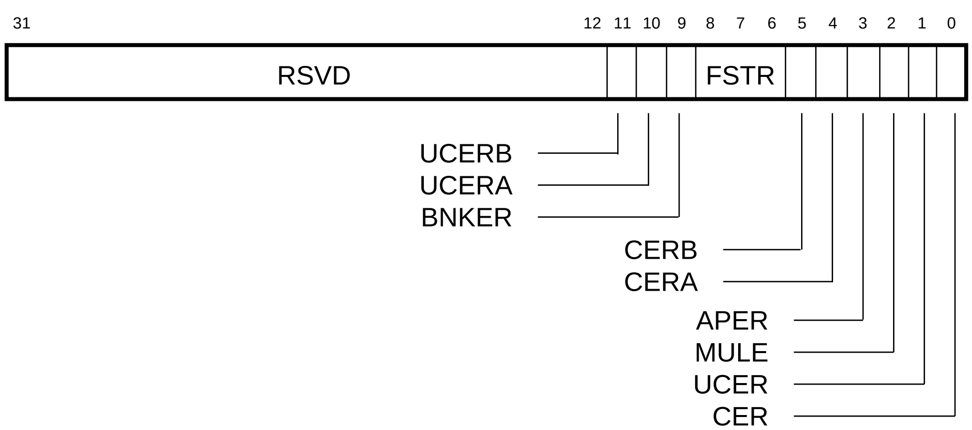
BXB-0215-92

Figure 1-64 FADR — Failing Address Register



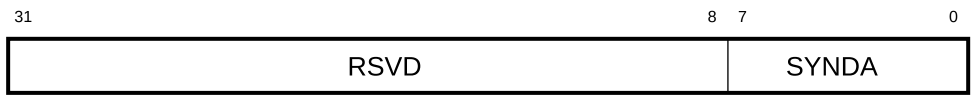
BXB-0214-92

Figure 1-65 MERA — Memory Error Register A



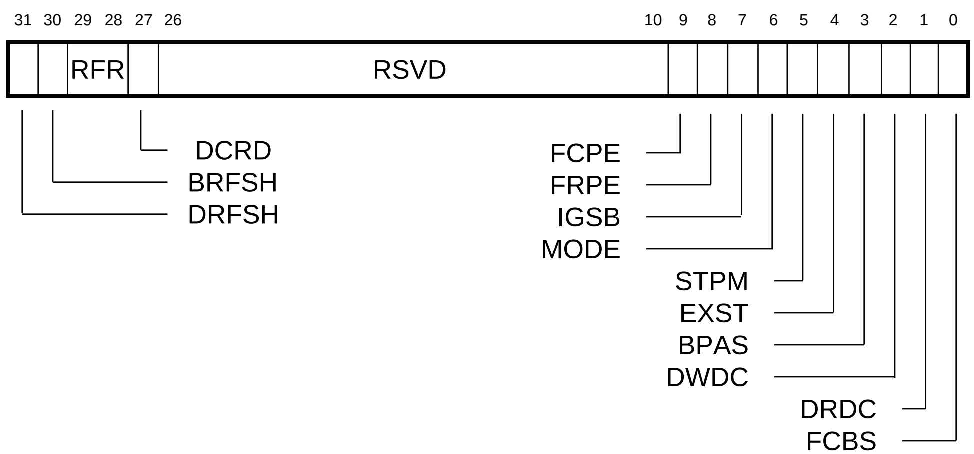
BXB-0219 -92

Figure 1-66 MSYNDA — Memory Syndrome Register A



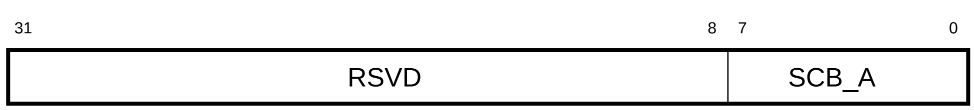
BXB-0223-92

Figure 1-67 MDRA — Memory Diagnostic Register A



BXB-0225-92

Figure 1-68 MCBSA — Memory Check Bit Substitute Register A



BXB-0221-92

Figure 1-69 MERB — Memory Error Register B

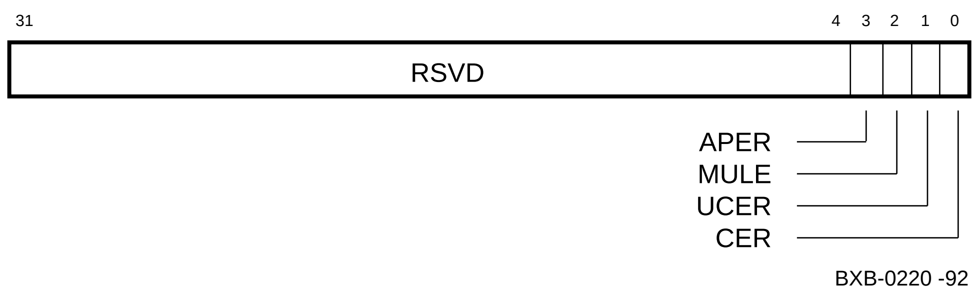


Figure 1-70 MSYNDB — Memory Syndrome Register B

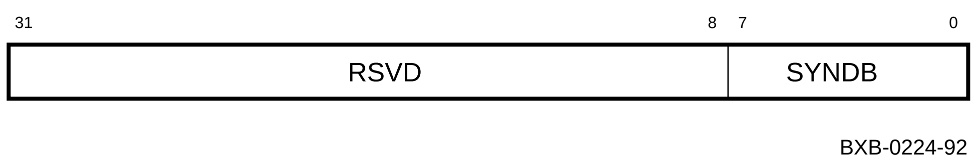


Figure 1-71 MDRB — Memory Diagnostic Register B

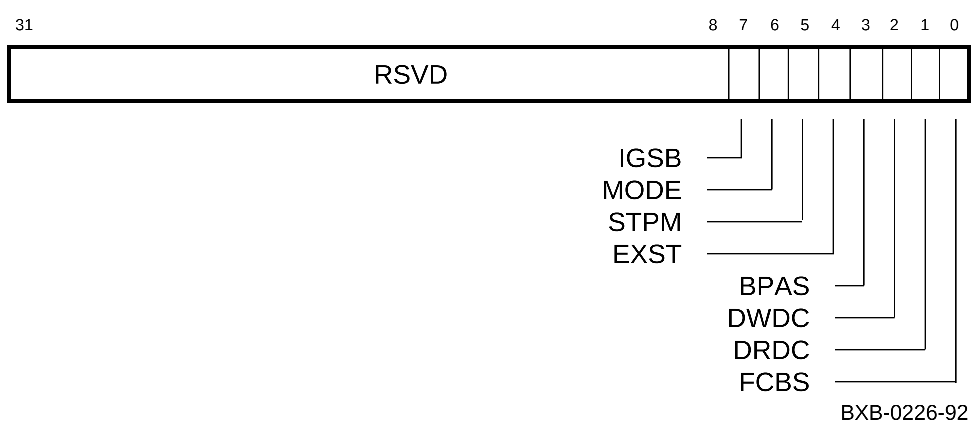
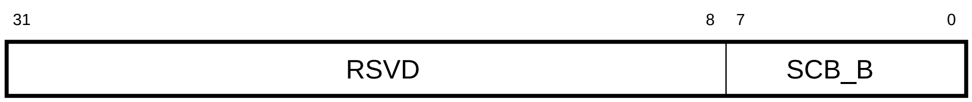


Figure 1-72 MCBSB — Memory Check Bit Substitute Register B



BXB-0222-92

1.3 I/O Port Registers

Table 1-6 I/O Port Registers

Mnemonic	Register Name	Physical Address	Software Address
LDEV	Device	50 0000	A00 0000
LBER	Bus Error	50 0002	A00 0040
LCNR	Configuration	50 0004	A00 0080
IBR	Information Base Repair	50 0006	A00 00C0
LMMR0	Memory Mapping 0	50 0010	A00 0200
LMMR1	Memory Mapping 1	50 0012	A00 0240
LMMR2	Memory Mapping 2	50 0014	A00 0280
LMMR3	Memory Mapping 3	50 0016	A00 02C0
LMMR4	Memory Mapping 4	50 0018	A00 0300
LMMR5	Memory Mapping 5	50 001A	A00 0340
LMMR6	Memory Mapping 6	50 001C	A00 0380
LMMR7	Memory Mapping 7	50 001E	A00 03C0
LBESR0	Bus Error Syndrome 0	50 0030	A00 0600
LBESR1	Bus Error Syndrome 1	50 0032	A00 0640
LBESR2	Bus Error Syndrome 2	50 0034	A00 0680
LBESR3	Bus Error Syndrome 3	50 0036	A00 06C0
LBECR0	Bus Error Command 0	50 0038	A00 0700
LBECR1	Bus Error Command 1	50 003A	A00 0740
LILID0	Interrupt Level 0 IDENT	50 0050	A00 0A00
LILID1	Interrupt Level 1 IDENT	50 0052	A00 0A40
LILID2	Interrupt Level 2 IDENT	50 0054	A00 0A80
LILID3	Interrupt Level 3 IDENT	50 0056	A00 0AC0
LCPUMASK	CPU Interrupt Mask	50 0058	A00 0B00

Table 1-6 I/O Port Registers (Continued)

Mnemonic	Register Name	Physical Address	Software Address
LMBPR	Mailbox Pointer	50 0060	A00 0C00
IPCNSE	I/O Port Chip Node-Specific Error	50 0100	A00 2000
IPCVR	I/O Port Chip Vector	50 0102	A00 2040
IPCMSR	I/O Port Chip Mode Selection	50 0104	A00 2080
IPCHST	I/O Port Chip Hose Status	50 0106	A00 20C0
IPCDR	I/O Port Chip Diagnostic	50 0108	A00 2100

Figure 1-73 IBR — Information Base Repair Register

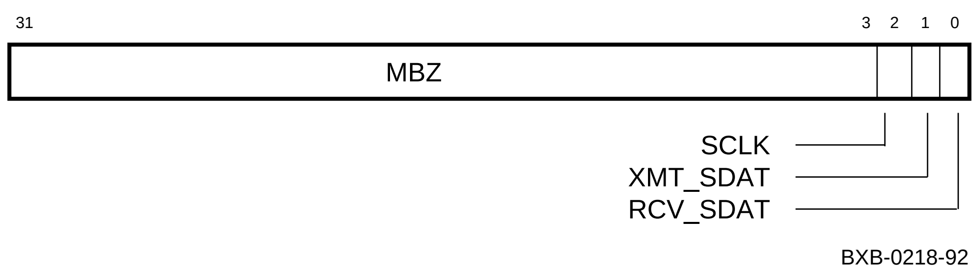


Figure 1-74 LILID0–3 — Interrupt Level 0–3 IDENT Registers

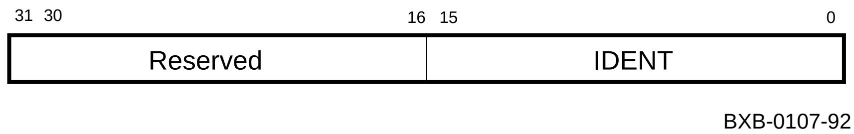


Figure 1-75 LCPUMASK — CPU Interrupt Mask Register

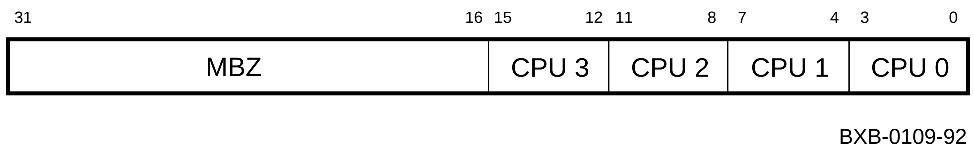


Figure 1-76 LMBPR — Mailbox Pointer Register

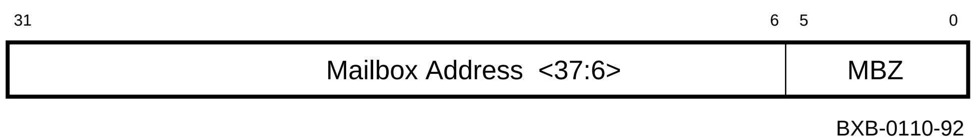


Figure 1-77 IPCNSE — I/O Port Chip Node-Specific Error Register

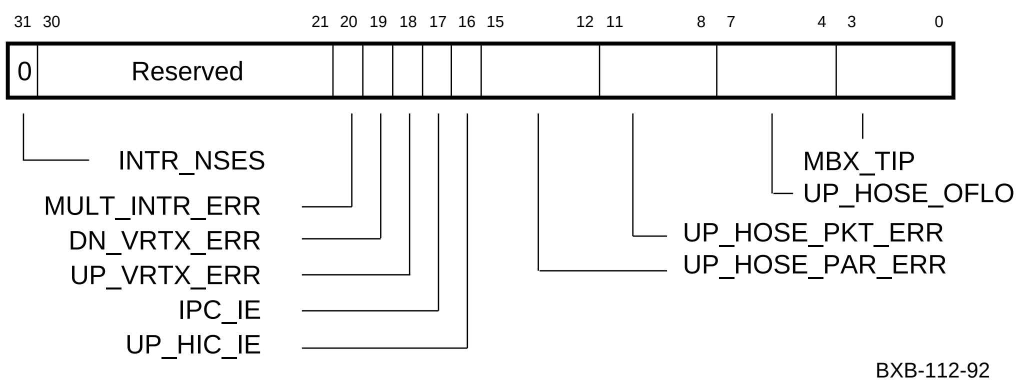


Figure 1-78 IPCVR — I/O Port Chip Vector Register

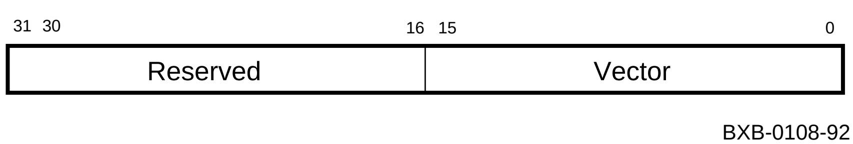


Figure 1-79 IPCMSR — I/O Port Chip Mode Selection Register

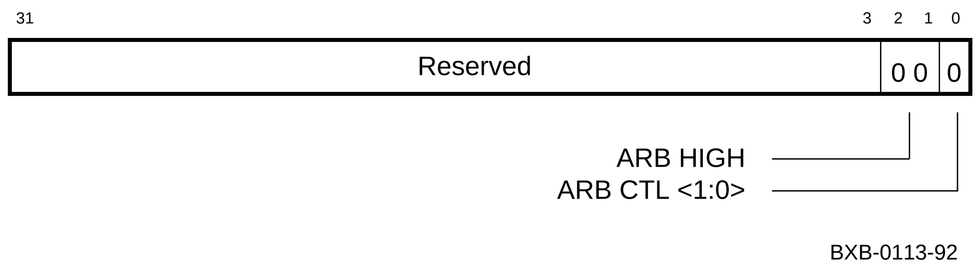


Figure 1-80 IPCHST — I/O Port Chip Hose Status Register

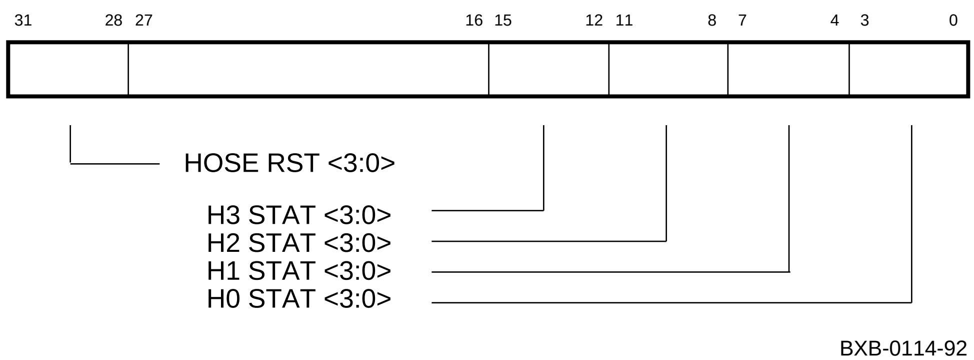
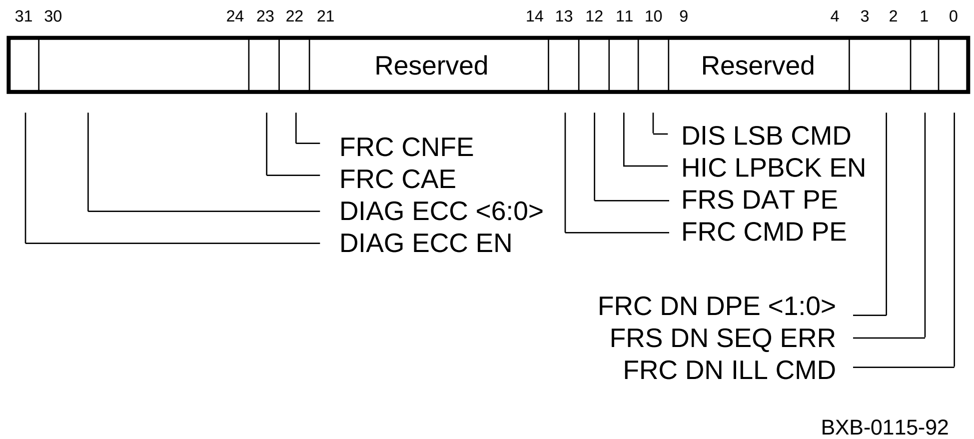


Figure 1-81 IPCDR — I/O Port Chip Diagnostic Register



1.4 DWLMA Registers

Table 1-7 LSB Registers

Mnemonic	Register Name	Address
LDIAG	Diagnostic	BB + 40
IMSK	Interrupt Mask	BB + 44
LEVR	Error Vector	BB + 48
LERR	Error	BB + 4C
LGPR	General Purpose	BB + 50
IPR1	Interrupt Pending 1	BB + 54
IPR2	Interrupt Pending 2	BB + 58
IIPR	Interrupt in Progress	BB + 5C

Figure 1-82 LDIAG — Diagnostic Register

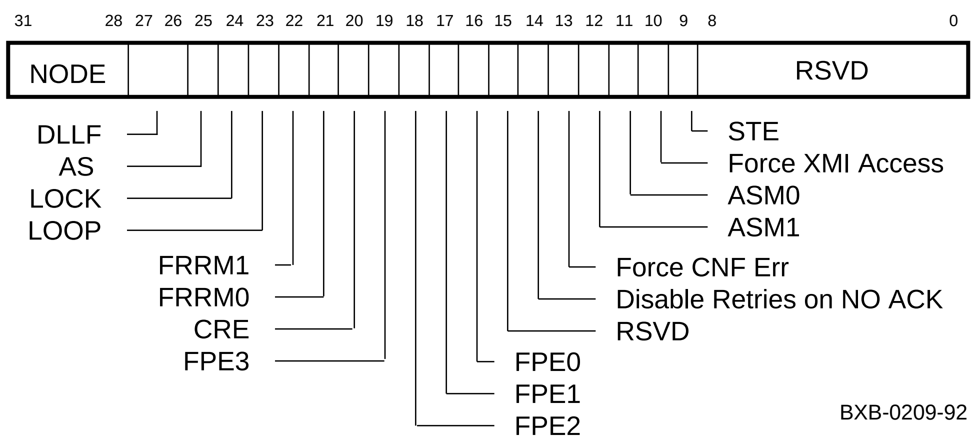


Figure 1-83 IMSK — Interrupt Mask Register

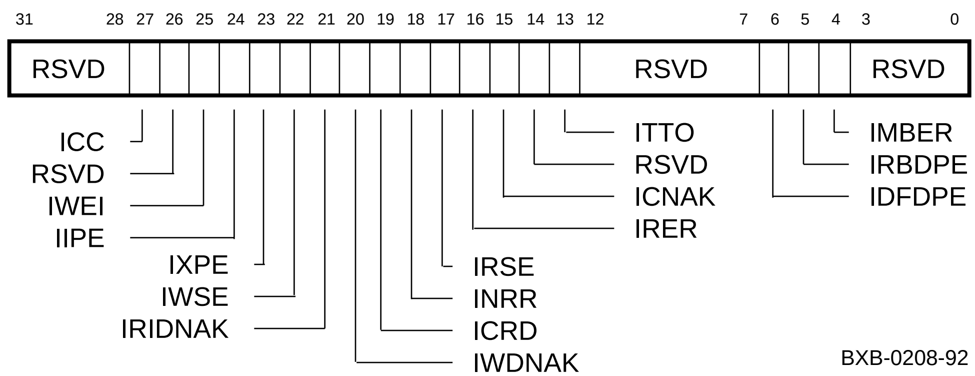


Figure 1-84 LEVR — Error Vector Register

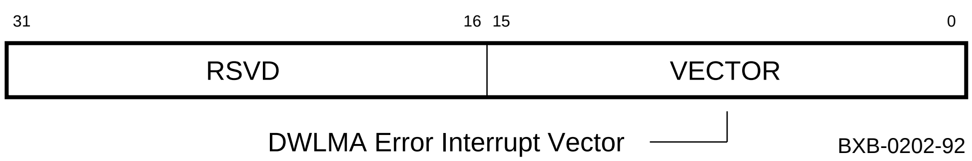


Figure 1-85 LERR — Error Register

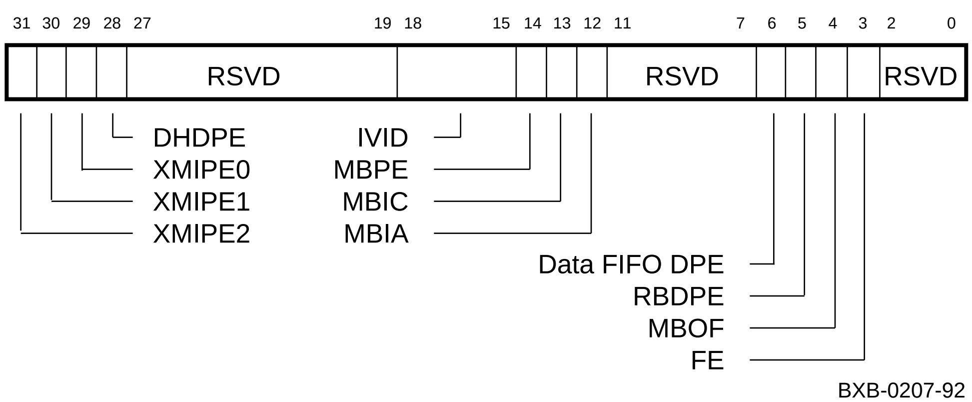
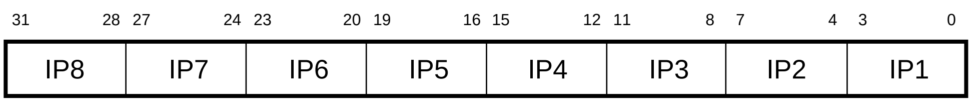


Figure 1-86 LGPR — General Purpose Register



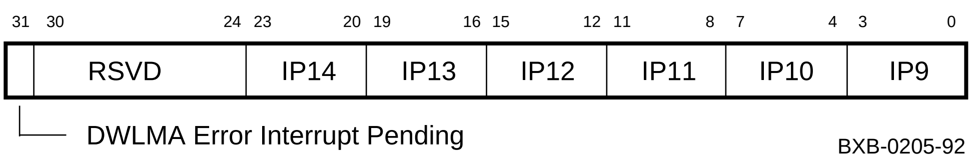
BXB-0203-92

Figure 1-87 IPR1 — Interrupt Pending Register 1



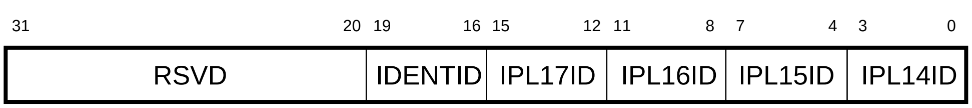
BXB-0204-92

Figure 1-88 IPR2 — Interrupt Pending Register 2



BXB-0205-92

Figure 1-89 IIPR — Interrupt in Progress Register



BXB-0206-92

Table 1-8 XMI Registers

Mnemonic	Register Name	Address
XDEV	Device	BB + 0000
XBER	Bus Error	BB + 0004
XFADR	Failing Address	BB + 0008
XFAER	Failing Address Extension	BB + 000C
IBR	Information Base Repair	BB + 0010

Figure 1-90 XDEV — Device Register

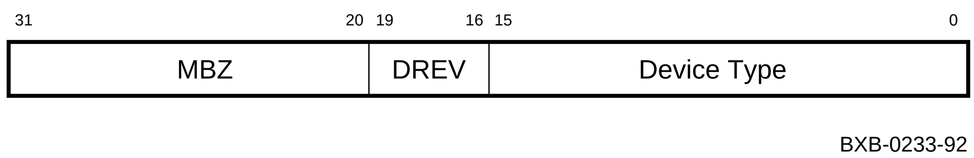


Figure 1-91 XBER — Bus Error Register

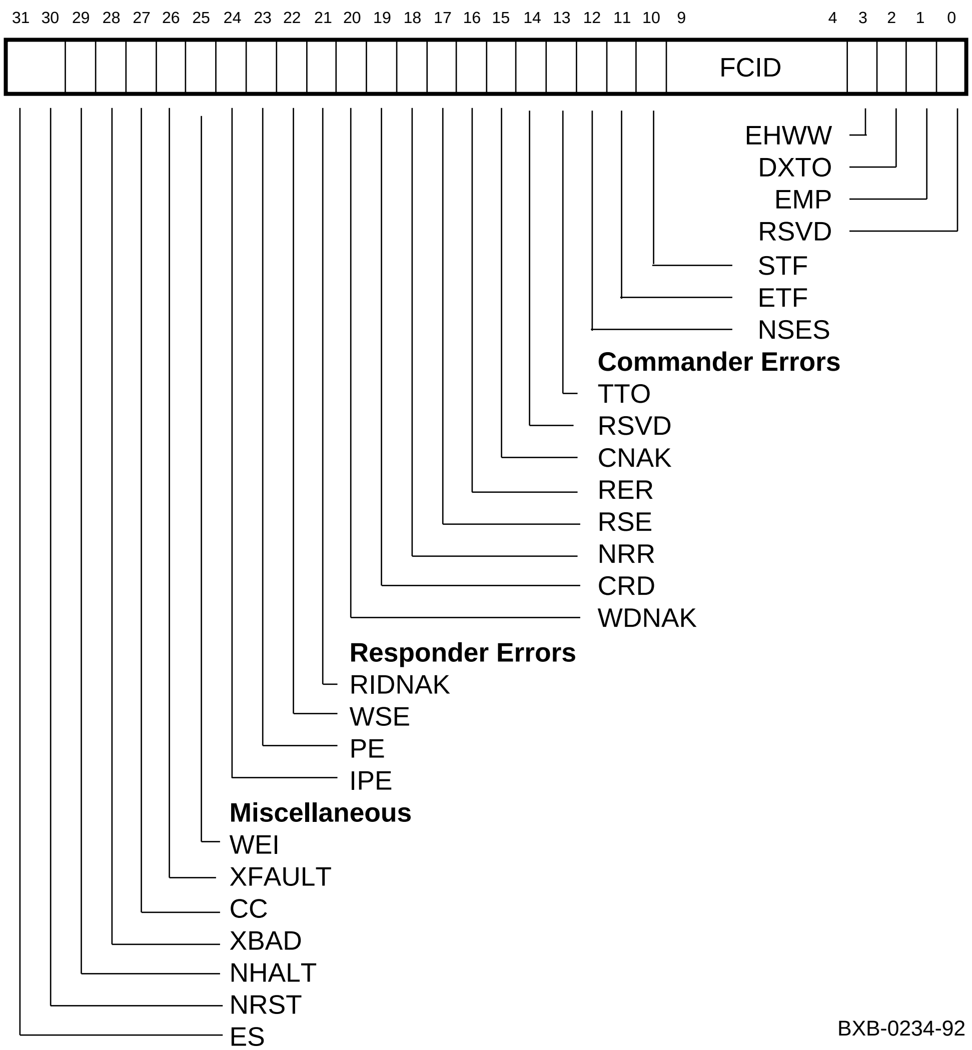


Figure 1-92 XFADR — Failing Address Register

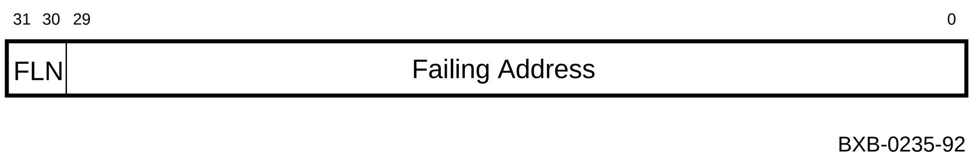


Figure 1-93 XFAER — Failing Address Extension Register

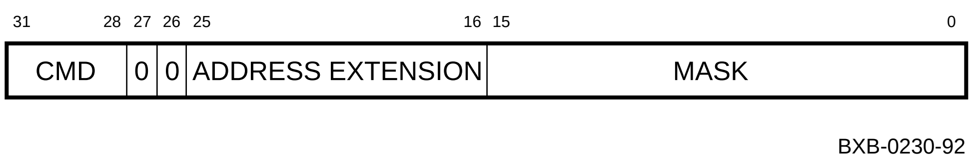
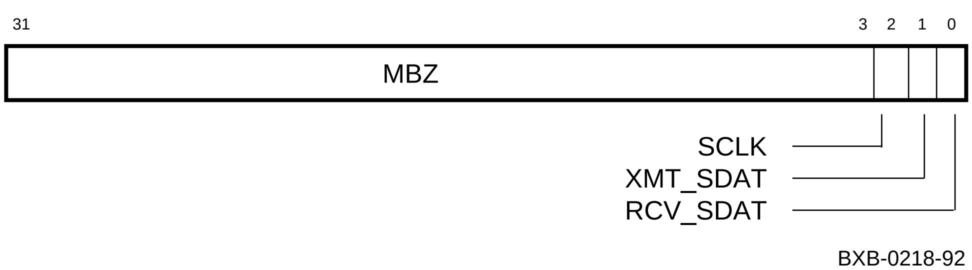


Figure 1-94 IBR — Information Base Repair Register



Chapter 2

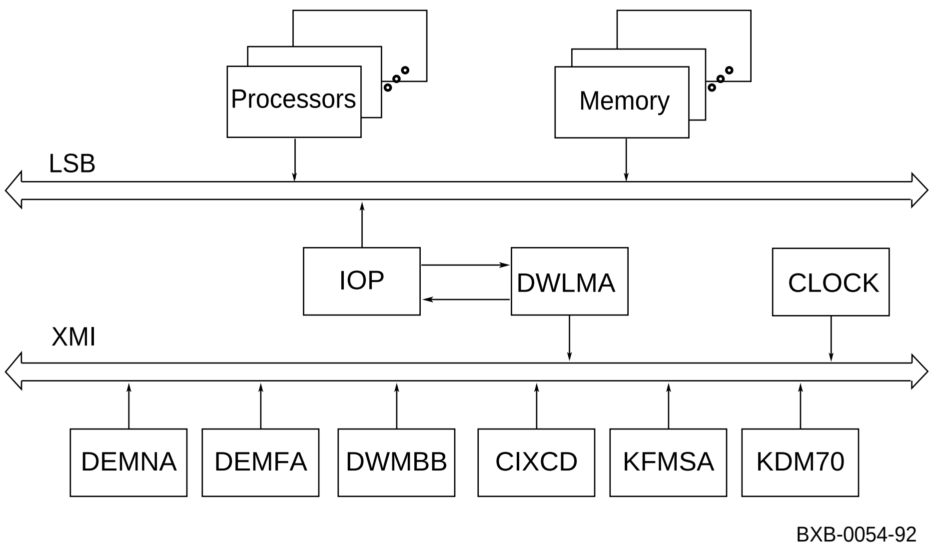
Addressing

This chapter includes an overview of the VAX 7000 system and addressing information for the buses used in the system. Sections include:

- VAX 7000 Block Diagram
- LSB Address Space
- XMI Addresses
- VAXBI Addresses

2.1 VAX 7000 Block Diagram

Figure 2-1 VAX 7000 Block Diagram



2.2 LSB Address Space

Figure 2-2 Virtual Address Space Layout

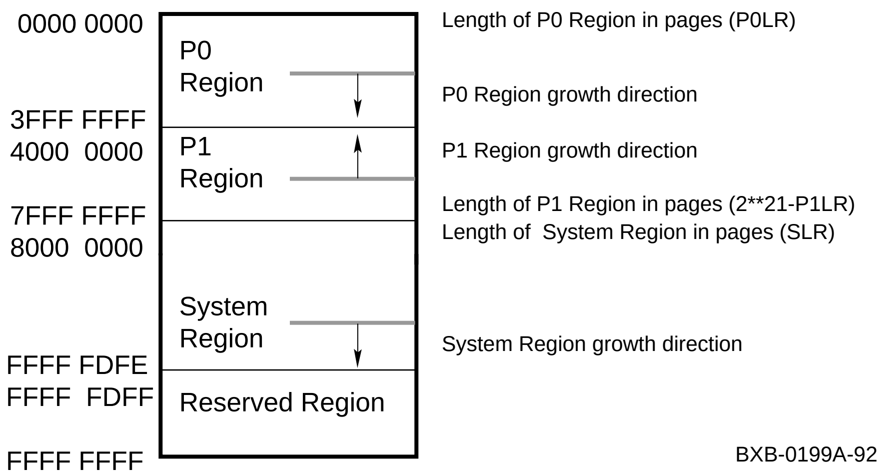


Figure 2-3 Physical Address Space Layouts

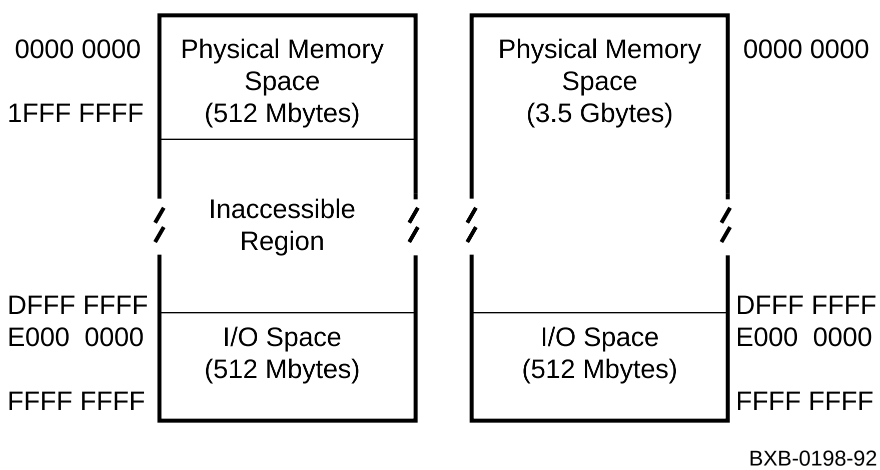


Figure 2-3 shows 30-bit addressing mode on the left and 32-bit addressing mode on the right.

Table 2-1 Address Mapping from 30-Bit Mode to 32-Bit Mode

30-Bit Mode Address	32-Bit Mode Address
0000 0000 — 1FFF FFFF	0000 0000 — 1FFF FFFF
2000 0000 — 3FFF FFFF	E000 0000 — FFFF FFFF

Table 2-2 LSB Node Base Addresses

Node	Module	Base Physical Address (BB)
0	CPU 0	F800 0000
1	Processor or memory	F840 0000
2	Processor or memory	F880 0000
3	Processor or memory	F8C0 0000
4	Memory	F900 0000
5	Memory	F940 0000
6	Memory	F980 0000
7	Memory	F9C0 0000
8	IOP	FA00 0000
Broadcast Space Base	BSB	FE00 0000

For more information:

KA7AA CPU Technical Manual

Table 2-3 Device Type Codes

Device	Code (hex)
KA7AA	8002
MS7AA	4000
IOP	2000
DWLMA	102A
CIXCD	0C05
DEMFA	0823
DEMNA	0C03
DWMBB	2002
KDM70	0C22
KFMSA	0810

2.3 XMI Addresses

Table 2-4 XMI Node Addresses

Node	Mailbox Base Physical Address (BB)	XMI Base Physical Address (BB)
1	6180 0000	80 0180 0000
2	6188 0000	80 0188 0000
3	6190 0000	80 0190 0000
4	6198 0000	80 0198 0000
5	61A0 0000	80 01A0 0000
6	61A8 0000	80 01A8 0000
7	61B0 0000	80 01B0 0000
8	61B8 0000	80 01B8 0000
9	61C0 0000	80 01C0 0000
10	61C8 0000	80 01C8 0000
11	61D0 0000	80 01D0 0000
12	61D8 0000	80 01D8 0000
13	61E0 0000	80 01E0 0000
14	61E8 0000	80 01E8 0000

2.4 VAXBI Addresses

To examine a VAXBI register from the VAX 7000 console (see Example 2-1), you need three pieces of information:

1. The XMI number (0–3) to which the VAXBI bus is connected.
2. The base address of the VAXBI node (see Table 2-5).
3. The offset of the VAXBI register to be examined (see Table 2-6).

The address of the register to be examined is expressed in this form:

`xmi`*`n`*`:220`*`xxyyy`*

where: *n* = the XMI number
xx = the base address of the VAXBI node
yyy = the address offset of the VAXBI register

To calculate the address of the VAXBI register, add 2200 0000 plus the base address of the VAXBI node (Table 2-5) plus the address offset of the VAXBI register (Table 2-6).

NOTE: You must look at the node ID plug on the backplane of the VAXBI card cage to determine the node ID of the VAXBI option.

Example 2-1 Examining the Device Register of VAXBI Node 7

```
>>> e xmi1:2200E000
xmi1: 2200E000 131C010E
>>>
```

Table 2-5 Base Addresses of VAXBI Nodes

Node ID	Base Address
0	0000 0000
1	0000 2000
2	0000 4000
3	0000 6000
4	0000 8000
5	0000 A000
6	0000 C000
7	0000 E000
8	0001 0000
9	0001 2000
A	0001 4000
B	0001 6000
C	0001 8000
D	0001 A000
E	0001 C000
F	0001 E000

Table 2-6 Address Offsets of VAXBI Registers

Mnemonic	Register Name	Address Offset
DTYPE	Device	bb [1] + 00
VAXBICSR	VAXBI Control and Status	bb + 04
BER	Bus Error	bb + 08
EINTRSCR	Error Interrupt Control	bb + 0C
INTRDES	Interrupt Destination	bb + 10
IPINTRMSK	IPINTR Mask	bb + 14
FIPSDES	Force-Bit IPINTR/STOP Destination	bb + 18
IPINTRSRC	IPINTR Source	bb + 1C
SADR	Starting Address	bb + 20
EADR	Ending Address	bb + 24
BCICSR	BCI Control and Status	bb + 28
WSTAT	Write Status	bb + 2C
FIPSCMD	Force-Bit IPINTR/STOP Command	bb + 30
UINTRCSR	User Interface Interrupt Control	bb + 40
GPR0	General Purpose Register 0	bb + F0
GPR1	General Purpose Register 1	bb + F4
GPR2	General Purpose Register 2	bb + F8
GPR3	General Purpose Register 3	bb + FC
SOSR	Slave-Only Status	bb + 100
RXCD	Receive Console Data	bb + 200

[1] bb is the base address of the VAXBI node (the address of the first location of the nodespace).

Chapter 3

Console

This chapter contains an overview of the console command set and command syntax. It includes a section on device naming and examples of the use of selected commands. Sections include:

- Console Commands
- Environment Variables
- Device Name Fields
- Command Syntax
- Boot Command
- Cdp Command
- Show Configuration Command
- Show Device Command
- Show Network Command
- Show Power Command

3.1 Console Commands

Table 3-1 Console Commands

Command	Description
boot	Boot the operating system
build eeprom	Create a new EEPROM image
cdp	Perform basic configuration management of DSSI devices
clear	Clear the specified EEPROM option, remove a boot specification environment variable, or clear the terminal screen
continue	Resume processing at the point it was interrupted by Ctrl/P
create	Create an environment variable
deposit	Store data in a specified location
examine	Display contents of a memory location, a register, or a device
help	Provide basic information on the console commands when the system is in console mode
initialize	Initialize the entire system or a specified device or subsystem
repeat	Repeat a command; stop by entering Ctrl/C
set	Record the current system configuration in the EEPROM, set the selected EEPROM option, modify an environment variable, or connect to another console or service
show	Display the last saved configuration, device information for a disk or tape adapter, selected EEPROM information, current state of an environment variable, memory module information, information about network devices, or system power status
start	Begin execution of an instruction at specified address; does not initialize the system
stop	Stop a specified processor

Table 3-1 Console Commands (Continued)

Command	Description
test	Test a specified device, a subsystem, or the entire system (default)
update	Copy the contents of the EEPROM or FEPROMs on the boot processor to the EEPROM or FEPROMs on the specified secondary processor(s)
# or **!**	Introduce a comment

Table 3-2 Boot Command Options

Option	Meaning
-file <file>	Boot from the file **<file>**
-flags <val>	Boot flags that qualify the bootstrap. If omitted, the value of the environment variable **boot_flags** is used.

Table 3-3 Cdp Command Options

Option	Meaning
-a	Set device allocation class, **allclass**
-i	Select interactive mode; set all parameters
-n	Set device node name, **nodename** (up to 16 characters)
-o	Overridde warning messages
-u	Set device unit number, **unitnum**
-sa allclass	Set **allclass** for all DSSI devices in the system to the specified value
-sn	Set **nodename** to either RFhscn or TFhscn h is the device hose number (0–3) s is the device slot number (1–14) c is the device channel number (0, 1) n is the device node ID number (0–6)
-su unitnum	Set the starting **unitnum** for the first DSSI device in the system to the specified value. Subsequent DSSI unit numbers are incremented from this base.

Table 3-4 Clear EEPROM Command Options

Option	Meaning
diag_sdd	Remove from EEPROM failure information logged by symptom-directed diagnosis
diag_tdd	Remove from EEPROM failure information logged by test-directed diagnosis
log	Remove from EEPROM all failure information (symptom-directed diagnosis, test-directed diagnosis, and operating system)
symptom	Remove from EEPROM all failure information on operating system

Table 3-5 Create Command Option

Option	Meaning
-nv	Store the nonvolatile environment variable in EEPROM

Table 3-6 Deposit and Examine Command Options

Option	Meaning
-b	Define data size as a byte
-d	Disassemble instruction at current address (**examine** command only)
-h	Define data size as a hexword
-l	Define data size as a longword; initial default
-o	Define data size as an octaword
-q	Define data size as a quadword
-w	Define data size as a word
-n val	Number of consecutive locations to modify
-s val	Address increment size. Default is data size.
-u	Allow access to console private memory, while disabling virtual address protection checks
space:	Device name and address space, as follows:
<dev_name>	Device name; for example, xmi0, ka7aa0, or demna0
gpr	Define the address space as the general register set, R0 through R15. The data size is always a longword.
ipr	Define the address space as the internal processor registers (IPRs). The data size is always a longword.
psl	Define the address space as the processor status longword (PSL).
pmem	Define the address space as physical memory; initial default
vmem	Define the address space as virtual memory. All access and protection checking occur.

Table 3-7 Set EEPROM Command Options

Option	Meaning
field	Record the LARS report number and comment
manufacturing	Record manufacturing information: module serial number, module part number, and module firmware revision
serial	Record system serial number

Table 3-8 Set Host Command Options

Option	Meaning
-bus b	DSSI bus on which the node resides
-dup	Remote node is a DUP server

Table 3-9 Show EEPROM Command Options

Option	Meaning
diag_sdd	Display failure information logged by symptom-directed diagnosis
diag_tdd	Display failure information logged by test-directed diagnosis
field	Display LARS number and comment
manufacturing	Display manufacturing information: module serial number, module part number, and module firmware revision
serial	Display system serial number
symptom	Display failure information logged on operating system

Table 3-10 Show Power Command Options

Option	Meaning
-h	History status — the value of each parameter at the last system shutdown
-s	Current status (default)
main	Power status of the main cabinet (default)
right	Power status of the expander cabinet to the right of the main cabinet
left	Power status of the expander cabinet to the left of the main cabinet

Table 3-11 Test Command Options

Option	Meaning
-write	Select writes to media as well as reads (read-only is the default). Applicable only to disk testing (ignored otherwise).
-nowrite <list>	Used with **-write** to prevent selected devices or groups of devices from being written to
-omit <list>	Specify device not to test; takes a single device or device list as a qualifier
-t <time>	Run time in seconds for the **test** command; default for system is 600 seconds (10 minutes).
-q	"Quiet" option prevents informational messages about testing start and stop from being displayed on the console terminal. Error messages are always reported.

Table 3-12 Update Command Options

Option	Meaning
-flash	Update the FEPROMs on the specified secondary processor
-eeprom	Update the EEPROM on the specified secondary processor

For more information:

VAX 7000 Console Reference Manual
VAX 7000 Advanced Troubleshooting

3.2 Environment Variables

An environment variable is a name and a value association maintained by the console program. The value associated with an environment variable is an ASCII string (up to 128 characters) or an integer. Volatile environment variables are initialized by a system reset; others are nonvolatile across system failures.

Environment variables can be created, modified, displayed, and deleted using the console **create**, **set**, **show**, and **clear** commands.

Table 3-13 Environment Variables

Variable	Attribute	Function
auto_action	Nonvolatile	The action the console will take following an error halt. Values are: **restart**—Automatically restart. If restart fails, boot the operating system. **boot**—Automatically boot the operating system **halt**—Enter console mode (default)
baud	Nonvolatile	Sets the baud rate of the console terminal port to 300, 600, 1200, 2400, 4800, or 9600 (default)
bootdef_dev	Nonvolatile	The default device or device list from which booting is attempted when the **boot** command does not specify a device name
boot_file	Nonvolatile	The default file name used for the primary bootstrap when the **boot** command does not specify a file name
boot_osflags	Nonvolatile	Additional parameters passed to the system during booting if none are specified by the **-flags** qualifier to the **boot** command
boot_reset	Nonvolatile	Resets system and displays self-test results during booting. Default is **off**.
cpu	Volatile	Selects the current boot processor

Table 3-13 Environment Variables (Continued)

Variable	Attribute	Function
cpu_enabled	Nonvolatile	A bitmask indicating which processors are enabled to run (leave console mode). If not defined, all processors are considered enabled. Default is **0xFF**.
cpu_primary	Nonvolatile	A bitmask indicating which processors are enabled to become the next boot processor after the next reset. If not defined, all available processors are considered enabled. Default is **0xFF**.
d_harderr	Volatile	Determines action taken following a hard error. Values are **halt** (default) and **continue**. Applies only when using the **test** command.
d_report	Volatile	Determines level of information provided by the diagnostic reports. Values are **summary** (default) and **full**. Applies only when using the **test** command.
d_softerr	Volatile	Determines action taken following a soft error. Values are **continue** (default) and **full**. Applies only when using the **test** command.
enable_audit	Nonvolatile	When set to on, allows audit trail messages to be displayed during booting.
interleave	Nonvolatile	The memory interleave specification. Values must be **default**, **none**, or an explicit interleave list. Default value is **default**.
language	Nonvolatile	Determines whether system displays message numbers or message text in English (default).

For more information:

VAX 7000 Console Reference Manual

3.3 Device Name Fields

Device names are used in several console commands. A device name is expressed in the form **ddccuuuu.node.channel.slot.hose**. Fields are separated by periods. Table 3-14 lists the field definitions.

Table 3-14 Device Name Fields

Field	Size	Definition
dd	2	Protocol used to access the device: du MSCP disk (CI, SI, DSSI) mu MSCP tape (CI, SI, DSSI) ex XMI Ethernet fx XMI FDDI
cc	2 (max)	Controller letter (a–zz) assigned by console, based on the system configuration
uuuu	4 (max)	Unit number of the device (0–9999) determined by the I/O channel number and the XMI slot number of the adapter
node	3 (max)	Node number (0–255) of the device on a remote (CI or DSSI) bus. If the remote bus is a CI, this is the CI node number of the HSC; if it is a DSSI, this is the node number of the disk.
channel	1	Channel number (0–1); used only if the adapter is a KFMSA
slot	2 (max)	XMI slot number (1–14) of the adapter
hose	1	Hose number (0–3) that connects to the XMI bus

For more information:

VAX 7000 Console Reference Manual
VAX 7000 Operations Manual

3.4 Command Syntax

b[**oot**] [**-fl**[**ags**] <parameters>] [**-fi**[**le**] <filename>] <device_name>

bu[**ild**] **ee**[**prom**]

cdp [-{**a**,**i**,**n**,**o**,**u**}] [**-sn**] [**-sa** <val>] [<dssi_device>]

cl[**ear**] **ee**[**prom**] <option>

cl[**ear**] <envar>

cl[**ear**] **sc**[**reen**]

c[**ontinue**]

cr[**eate**] [**-nv**] <envar> [<value>]

d[**eposit**] [-{**b**,**w**,**l**,**q**,**o**,**h**,**u**}] [{**-n val**, **-s val**}] [<space>:]<adrs> <data>

e[**xamine**] [-{**b**,**w**,**l**,**q**,**o**,**h**,**d**,**u**}] [{**-n val**, **-s val**}] [<space>:]<adrs>

h[**elp**] [<option>]

i[**nitialize**] [<device_name>]

r[**epeat**] [<command>]

se[**t**] **c**[**onfiguration**]

se[**t**] **ee**[**prom**] [<option>]

se[**t**] <envar> [<value>]

se[**t**] **h**[**ost**] [**-dup**] [**-bus** <b>] **node** [<task>]

sh[**ow**] **c**[**onfiguration**]

sh[**ow**] **dev**[**ice**] [<dev_name>]

sh[**ow**] **ee**[**prom**] [<option>]

sh[**ow**] <envar>

sh[**ow**] **m**[**emory**]

sh[**ow**] **ne**[**twork**]

sh[**ow**] **power** [{**-h**, **-s**}] [{**main**, **right**, **left**}]

s[**tart**] <address>

sto[**p**] <cpu_device_name>

t[**est**] [**-write**] [**-nowrite** <list>] [**-omit** <list>] [**-t** <time>] [**-q**] [<dev_arg>]

upd[**ate**] [-{**e**[**eprom**], **f**[**lash**]}] [<device_name>]

Table 3-15 Console Special Characters

Character	Function
Return	Carriage return; ends a command line
Backslash	Line continuation
⌫	Delete key; deletes previously typed character
Help	By itself, displays first-level help. When pressed after part of a command, displays options available.
Ctrl/A, F14	Toggles between insertion and overstrike modes
Ctrl/B, ⇑	Recall previous command
Ctrl/C	Terminate running process
Ctrl/D, ⇐	Move cursor left one position
Ctrl/E	Move cursor to end of line
Ctrl/F, ⇒	Move cursor right one position
Ctrl/H, BS, F12	Move cursor to beginning of line
Ctrl/J	Delete word
Ctrl/O	Stop output to console terminal for current command. Toggles between enable and disable.
Ctrl/P	In console mode, acts like Ctrl/C. In program mode, causes the boot processor to halt and begin running the console program.
Ctrl/Q	Resume output to console terminal
Ctrl/R	Redisplay the current line
Ctrl/S	Stop output to console terminal
Ctrl/U	Delete entire line
*	Wildcarding for some commands
" "	Quotes for **set** environment variable name
#, !	Comment specifier

For more information:

VAX 7000 Console Reference Manual
VAX 7000 Advanced Troubleshooting

3.5 Boot Command

Example 3-1 Boot Command — Booting from an InfoServer

```
>>> show network
polling for units on demna0, slot 3, xmi0...
exa0.0.0.3.0 08-00-2B-0B-BB-ED
>>> boot exa0 -file ISL_LVAX_BL10
Initializing...
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
                     A  M  .  .  .  .  .  P  P  TYP
                     o  +  .  .  .  .  .  +  +  ST1
                     .  .  .  .  .  .  .  E  B  BPD
                     o  +  .  .  .  .  .  +  +  ST2
                     .  .  .  .  .  .  .  E  B  BPD
                     +  +  .  .  .  .  .  +  +  ST3
                     .  .  .  .  .  .  .  E  B  BPD

   .  .  .  .  +  .  +  .  .  .  .  +  .  +     C0 XMI +
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C1
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C2
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C3

                     . A0  .  .  .  .  .  .  .  ILV
                     .128  .  .  .  .  .  .  .  128Mb
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
Booting...
Connecting to boot device exa0 -file ISL_LVAX_BL10
Created boot device: exa0.0.0.3.0
Resulting file is mopd1:ISL_LVAX_BL10/exa0.0.0.3.0
.....
Load complete!
Network Initial System Load Function
Version 1.1
FUNCTION         FUNCTION
   ID
   1      -      Display Menu
   2      -      Help
   3      -      Choose Service
   4      -      Select Options
   5      -      Stop
Enter a function ID value: 3
   OPTION        OPTION
     ID
     1    -      Find Services
     2    -      Enter known Service Name
Enter an Option ID value: 1
Working
Servers found: 2
```

Example 3-1 Boot Command — Booting from an InfoServer (Continued)

```
Service Name Format:
       Service Number
       Service Name
       Server Name
       Ethernet ID
#1
VMS054
ESS_08002B0BBBED
08-00-2B-0B-BB-ED
#2
CD_BIN_83371
ESS_08002B0BBBED
08-00-2B-0B-BB-ED
#1
INFO3$RZ57
INFO3
08-00-2B-26-A6-98
#2
CD_DOC_0050
INFO3
08-00-2B-16-04-98
Enter a Service number or <CR> for more: 1
         [operating system banner appears]
```

Table 3-16 Sample Boot Commands

Boot From	Sample Boot Command
Local device	**boot dua2.2.0.1.0**
InfoServer on Ethernet	**boot exa0 -file ISL_LVAX_BL10**
InfoServer on FDDI	**boot fxa0 -file ISL_LVAX_BL10**
CI VAXcluster	**boot -fl 0,4,0 dua20.14.0.2.0**
Shadow set	**b -fl 8DAC,2,0 dua3500.14.0.12.1, dua63.14.0.12.1**
DSSI VAXclus-ter	**boot -flags 0,3,0 dub1.1.0.6.0**

For more information:

VAX 7000 Console Reference Manual
VAX 7000 Operations Manual

3.6 Cdp Command

Example 3-2 Cdp Command

```
>>> show device
polling for units on kfmsa0, slot 0, xmi0...
dua5.0.0.13.0    BASHFL$DIA5       RF71
polling for units on cixcd0, slot 14, xmi1...
dub44.1.0.13.0   $1$DIA44 (BLANK4) RF71

>>> cdp -i                         ! Interactive mode
dua5.0.0.13.0:
Node Name [BASHFL]?                ! Press Return to go to next
Allocation Class [0]?              ! field without making a
Unit Number [5]?                   ! change.
dub44.1.0.13.0:
Node Name [BLANK4]?
Allocation Class [1]
Unit Number [44]?                  ! Press Return to exit.

>>> cdp -n dua5                    ! Set device node name of dua5.
dua5.0.0.13.0:
Node Name [BASHFL]?                ! Exit, no changes made.

>>> cdp -a                         ! Set device allocation class.
dua5.0.0.13.0:
Allocation Class [0]?
dub44.1.0.13.0:
Allocation Class [1]?              ! Exit, no changes made.
```

For more information:

VAX 7000 Console Reference Manual

3.7 Show Configuration Command

Example 3-3 Show Configuration Command

```
>>> show config

      Name      Type       Rev        Mnemonic
LSB
0+    KA7AA     (8002)     0000       ka7aa0
1+    MS7AA     (4000)     0000       ms7aa0
7+    MS7AA     (4000)     0000       ms7aa1
8+    IOP       (2000)     0001       iop0

C0 XMI                                xmi0
8+    DWLMA     (102A)     0104       dwlma0
C+    KDM70     (0C22)     1E11       kdm700
E+    DEMNA     (0C03)     0802       demna0

C1 XMI                                xmi1
2+    KFMSA     (0810)     A2A6       kfmsa0
3+    DEMNA     (0C03)     0802       demna1
8+    DWLMA     (102A)     0104       dwlma1
A+    CIXCD     (0C05)     4611       cixcd0
C+    KDM70     (0C22)     1E11       kdm701
```

For more information:

VAX 7000 Console Reference Manual

3.8 Show Device Command

Example 3-4 Show Device Command

```
>>> show device
polling for units on kfmsa0, slot 1, xmi0...
dub1.1.1.1.2       RF3101$DIA1              RF72
dub3.3.1.1.2       RF3103$DIA3              RF72
polling for units on kdm700, slot 11, xmi0...
duc1.0.0.11.2      DUC1                     RA70
duc2.0.0.11.2      DUC2                     RA70
duc3.0.0.11.2      DUC3                     RA70
duc213.0.0.11.2    DUC213                   RA82
>>>
```

For more information:

VAX 7000 Console Reference Manual

3.9 Show Network Command

Example 3-5 Show Network Command

```
>>> show network
polling for units on demna0, slot 14, xmi0...
exa0.0.0.14.0: 08-00-2B-24-3F-E1
polling for units on demfa0, slot 1, xmi1...
fxa0.0.0.1.1: 08-00-2B-29-E0-FF
>>>
```

For more information:

VAX 7000 Console Reference Manual

3.10 Show Power Command

Example 3-6 Show Power Command

```
>>> show power
Cabinet: Main             Regulator :         A            B            C
------------------------------------------------------------------------------
          Primary Micro Firmware Rev :        2.0          2.0          2.0
        Secondary Micro Firmware Rev :        2.0          2.0          2.0
                  Power Supply State :      NORMAL       NORMAL       BBU MODE
             AC Line Voltage (V RMS) :      113.71       114.35       115.93
               DC Bulk Voltage (VDC) :      227.02       227.02       227.02
            48V DC Bus Voltage (VDC) :       47.57        47.57        47.57
            48V DC Bus Current (ADC) :       30.17        29.68        29.58
      48V Battery Pack Voltage (VDC) :       50.85        50.72        47.91
      24V Battery Pack Votlage (VDC) :       25.56        25.56        23.95
   Battery Pack Charge Current (IDC) :        2.91         2.90        0
      Ambient Temperature (Degree C) :       26.22        24.80        24.75
                Elapsed Time (Hours) :      290.00       290.00       290.00
Remaining Battery Capacity (Minutes) :        8.00         8.00         8.00
     Battery Cutoff Counter (Cycles) :        0            1.00         1.00
               Battery Configuration :  4 Batteries  4 Batteries  4 Batteries
                     Heatsink Status :      NORMAL       NORMAL       NORMAL
                 Battery Pack Status :      CHARGING     CHARGING     DISCHG'G
                Last UPS Test Status :      PASSED       PASSED       TESTING
LDC POWER Status     : 0
PIU Primary Status   : 0
PIU Secondary Status : 0
```

The cabinet in Example 3-6 has three power regulators. If the cabinet has fewer than three regulators, the appropriate column (A, B, or C) is left blank. The bottom three lines of the output, showing PIU power status, apply only to the main cabinet.

Table 3-17 lists the abbreviations used in four lines of the Show Power command: Power Supply State, Heatsink Status, Battery Pack Status, and Last UPS Test Status.

> **For more information:**
>
> ***VAX 7000 Console Reference Manual***

Table 3-17 Abbreviations Used in Show Power Command Output

Abbreviation	Meaning
Power Supply State	
NORMAL	Normal AC operation
BBU MODE	UPS mode
BRKR OPEN	Breaker open
NO AC IN	No AC voltage
KEYSW OFF	Keyswitch off
NON FATAL	Nonfatal fault
FATAL	Fatal fault
SPARE	
Heatsink Status	
BROKEN	Broken
FAULT	Fault (red zone)
WARNING	Warning
NORMAL	Normal operation
Battery Pack Status	
NO BATTERY	Battery pack not installed
BATT FLT	Battery pack failure
BBU INH	UPS inhibit
CHG INH	Charger inhibit
BATT EOL	Battery at end of life
DISCHARG	Battery discharged
DISCHG'G	Discharging
CHARGING	Charging
OVER 24HRS	Charge mode longer than 24 hours
FULL CHG'D	Fully charged

Table 3-17 Abbreviations Used in Show Power Command Output (Continued)

Abbreviation	Meaning
Last UPS Test Status	
NO BATTER	Battery pack not installed
NOT READY	Battery pack not ready (only if test requested)
ABORTED	Test aborted
TESTING	Test in progress
FAILED	Test failed
PASSED	Test passed

Chapter 4

Diagnostics

Diagnostics are run using console commands. This chapter contains examples of diagnostic sessions. Sections include:

- Test Command
- Set Host Command — Running DUP-Based Diagnostics and Utilities
- Set Host Command — Running Diagnostics on a Remote XMI Adapter

4.1 Test Command

Example 4-1 Test Command — System Test

```
>>> test -t 120
Configuring system...
Default system exerciser selected for run time of 120 seconds
Type Ctrl/C to abort

Starting floating point exerciser on ka7aa0 (id #57)
Starting floating point exerciser on ka7aa1 (id #58)
Starting memory exerciser, running on ka7aa0 (id #59)
Starting memory exerciser, running on ka7aa1 (id #60)
Starting multiprocessor exerciser on ka7aa* (id #61)
Starting network exerciser on exa0.0.0.4.0 in internal mode (id #62)
Starting network exerciser on exb0.0.0.5.0 in external mode (id #63)
Starting network exerciser on exc0.0.0.4.1 in external mode (id #64)
Starting network exerciser on fxa0.0.0.2.1 in external mode (id #65)
Starting network exerciser on fxb0.0.0.3.2 in external mode (id #66)
Starting device exerciser on dua10.14.0.1.0 (id #67)
Starting device exerciser on dub0.15.0.2.0 (id #68)
Starting device exerciser on duc0.0.0.3.0 (id #69)
Starting device exerciser on dud0.0.0.E.0 (id #70)
Starting device exerciser on dua11.14.0.1.0 (id #71)
Starting device exerciser on dub1.15.0.2.0 (id #72)
Starting device exerciser on duc1.1.0.3.0 (id #73)
Starting device exerciser on dud1.1.0.E.0 (id #74)
Starting device exerciser on dua12.14.0.1.0 (id #75)
Starting device exerciser on dub2.15.0.2.0 (id #76)
Starting device exerciser on dua13.14.0.1.0 (id #77)
Starting device exerciser on dub19.15.0.2.0 (id #78)
Stopping device exerciser on dua10.14.0.1.0 (id #67)
Stopping device exerciser on dub0.15.0.2.0 (id #68)
Stopping device exerciser on duc0.0.0.3.0 (id #69)
Stopping device exerciser on dud0.0.0.E.0 (id #70)
Stopping device exerciser on dua11.14.0.1.0 (id #71)
Stopping device exerciser on dub1.15.0.2.0 (id #72)
Stopping device exerciser on duc1.1.0.3.0 (id #73)
Stopping device exerciser on dud1.1.0.E.0 (id #74)
Stopping device exerciser on dua12.14.0.1.0 (id #75)
Stopping device exerciser on dub2.15.0.2.0 (id #76)
Stopping device exerciser on dua13.14.0.1.0 (id #77)
Stopping device exerciser on dub3.15.0.2.0 (id #78)
Starting device exerciser on dua20.14.0.1.0 (id #79)
Starting device exerciser on dub4.15.0.2.0 (id #80)
Starting device exerciser on dua21.14.0.1.0 (id #81)
Starting device exerciser on dub5.15.0.2.0 (id #82)
Starting device exerciser on dua22.14.0.1.0 (id #83)
Starting device exerciser on dub6.15.0.2.0 (id #84)
Starting device exerciser on dua23.14.0.1.0 (id #85)
```

Example 4-1 Test Command — System Test (Continued)

```
Starting device exerciser on dua30.14.0.1.0 (id #86)
Test time has expired...

Stopping floating point exerciser on ka7aa0 (id #57)
Stopping floating point exerciser on ka7aa1 (id #58)
Stopping memory exerciser on ka7aa0 (id #59)
Stopping memory exerciser on ka7aa1 (id #60)
Stopping multiprocessor exerciser (id #61)
Stopping network exerciser on exa0.0.0.4.0 (id #62)
Stopping network exerciser on exb0.0.0.5.0 (id #63)
Stopping network exerciser on exc0.0.0.4.1 (id #64)
Stopping network exerciser on fxa0.0.0.2.1 (id #65)
Stopping network exerciser on fxb0.0.0.3.2 (id #66)
Stopping device exerciser on dua20.14.0.1.0 (id #79)
Stopping device exerciser on dub4.15.0.2.0 (id #80)
Stopping device exerciser on dua21.14.0.1.0 (id #81)
Stopping device exerciser on dub5.15.0.2.0 (id #82)
Stopping device exerciser on dua22.14.0.1.0 (id #83)
Stopping device exerciser on dub6.15.0.2.0 (id #84)
Stopping device exerciser on dua23.14.0.1.0 (id #85)
Stopping device exerciser on dua30.14.0.1.0 (id #86)
Done testing...

The following devices were not tested:

  dua36.14.0.1.0
  dua37.14.0.1.0
  dua38.14.0.1.0
   .
   .
  dua77.15.0.1.0

>>>
```

Example 4-2 Test Command — Write/Read/Compare Test of All Disks Not Associated with Controller "a"

```
>>> test -nowrite "dua*" -write -t 120
Configuring system...
Default system exerciser selected for run time of 120 seconds
Type Ctrl/C to abort

You have selected destructive testing of the following devices:
   dub0.0.0.2.0
   dub1.1.0.2.0
   dub2.2.0.2.0
   dub3.3.0.2.0
   duc0.0.0.3.0
   duc1.1.0.3.0
   dud0.0.0.E.0
   dud1.1.0.E.0

Are you sure you want to perform writes to these disks? [yes/(no)] yes
User data on all selected devices may be lost. Continue? [yes/(no)] yes

Testing...

Starting floating point exerciser on ka7aa0 (id #213)
Starting floating point exerciser on ka7aa1 (id #214)
Starting memory exerciser, running on ka7aa0 (id #215)
Starting memory exerciser, running on ka7aa1 (id #216)
Starting multiprocessor exerciser on ka7aa* (id #217)
Starting network exerciser on exa0.0.0.4.0 in internal mode (id #218)
Starting network exerciser on exb0.0.0.5.0 in external mode (id #219)
Starting network exerciser on exc0.0.0.4.1 in external mode (id #220)
Starting network exerciser on fxa0.0.0.2.1 in external mode (id #221)
Starting network exerciser on fxb0.0.0.3.2 in external mode (id #222)
Starting device exerciser on dua10.14.0.1.0 (id #223)
Starting device exerciser in DESTRUCT mode on dub0.15.0.2.0 (id 224)
Starting device exerciser in DESTRUCT mode on duc0.0.0.3.0 (id #225)
Starting device exerciser in DESTRUCT mode on dud0.0.0.E.0 (id #226)
Starting device exerciser on dua11.14.0.1.0 (id #227)
Starting device exerciser in DESTRUCT mode on dub1.15.0.2.0 (id #228)
Starting device exerciser in DESTRUCT mode on duc1.1.0.3.0 (id #229)
Starting device exerciser in DESTRUCT mode on dud1.1.0.E.0 (id #230)
Starting device exerciser on dua12.14.0.1.0 (id #231)
Starting device exerciser in DESTRUCT mode on dub2.15.0.2.0 (id #232)
Starting device exerciser on dua13.14.0.1.0 (id #233)
Starting device exerciser in DESTRUCT mode on dub3.15.0.2.0 (id #234)
Stopping device exerciser on dua10.14.0.1.0 (id #223)
Stopping device exerciser on dub0.15.0.2.0 (id #224)
Stopping device exerciser on duc0.0.0.3.0 (id #225)
Stopping device exerciser on dud0.0.0.E.0 (id #226)
Stopping device exerciser on dua11.14.0.1.0 (id #227)
```

Example 4-2 Test Command — Write/Read/Compare Test of All Disks Not Associated with Controller "a" (Continued)

```
Stopping device exerciser on dub1.15.0.2.0 (id #228)
Stopping device exerciser on duc1.1.0.3.0 (id #229)
Stopping device exerciser on dud1.1.0.E.0 (id #230)
Stopping device exerciser on dua12.14.0.1.0 (id #231)
Stopping device exerciser on dub2.15.0.2.0 (id #232)
Stopping device exerciser on dua13.14.0.1.0 (id #233)
Stopping device exerciser on dub3.15.0.2.0 (id #234)
Starting device exerciser on dua20.14.0.1.0 (id #235)
Starting device exerciser in DESTRUCT mode on dub4.15.0.2.0 (id #236)
Starting device exerciser on dua21.14.0.1.0 (id #237)
Starting device exerciser in DESTRUCT mode on dub5.15.0.2.0 (id #238)
Starting device exerciser on dua22.14.0.1.0 (id #239)
Starting device exerciser in DESTRUCT mode on dub6.15.0.2.0 (id #240)
Starting device exerciser on dua23.14.0.1.0 (id #241)
Starting device exerciser on dua30.14.0.1.0 (id #242)
Test time has expired...

Stopping floating point exerciser on ka7aa0 (id #213)
Stopping floating point exerciser on ka7aa1 (id #214)
Stopping memory exerciser on ka7aa0 (id #215)
Stopping memory exerciser on ka7aa1 (id #216)
Stopping multiprocessor exerciser (id #217)
Stopping network exerciser on exa0.0.0.4.0 (id #218)
Stopping network exerciser on exb0.0.0.5.0 (id #219)
Stopping network exerciser on exc0.0.0.4.1 (id #220)
Stopping network exerciser on fxa0.0.0.2.1 (id #221)
Stopping network exerciser on fxb0.0.0.3.2 (id #222)
Stopping device exerciser on dua20.14.0.1.0 (id #235)
Stopping device exerciser on dub4.15.0.2.0 (id #236)
Stopping device exerciser on dua21.14.0.1.0 (id #237)
Stopping device exerciser on dub5.15.0.2.0 (id #238)
Stopping device exerciser on dua22.14.0.1.0 (id #239)
Stopping device exerciser on dub6.15.0.2.0 (id #240)
Stopping device exerciser on dua23.14.0.1.0 (id #241)
Stopping device exerciser on dua30.14.0.1.0 (id #242)
Done testing...

>>>
```

Example 4-3 Test Command — Destructive Exercising Selected, Then Aborted

```
>>> test -w -n "dua*"
Configuring system...
Default system exerciser selected for run time of 600 seconds
Type Ctrl/C to abort

You have selected destructive testing of the following devices:

   dub0.0.0.2.0
   dub1.1.0.2.0
   dub2.2.0.2.0
   dub3.3.0.2.0
   duc0.0.0.3.0
   duc1.1.0.3.0
   dud0.0.0.E.0
   dud1.1.0.E.0

Are you sure you want to perform writes to these disks? [yes/(no)] no

Testing aborted...

>>>
```

Example 4-4 Output from Test Command — Quiet Qualifier Set

```
>>> test -q -t 300
Configuring system...
Default system exerciser selected for run time of 300 seconds
Type Ctrl/C to abort

Done testing...

>>>
```

Example 4-5 Test Command — Detection of Memory Data Compare Error

```
>>> set d_report full
>>> test ms7aa*
Configuring system...
Testing ms7aa*
Type Ctrl/C to abort

Starting memory exerciser, running on ka7aa0 (id #77)
Starting memory exerciser, running on ka7aa1 (id #78)
Starting memory exerciser, running on ka7aa2 (id #79)


*** Hard Error - Error #23 on FRU: ka7aa0
Data compare error

     ID  Program          Device     Pass Hard/Soft Test     Time
-------- -------- --------------- -------- --------- ---- --------
00000078   mem_ex          memory      433    1    0    4 10:23:51

Expected value: FFFFFFE0
Received value: FFF7FFE0
Failing addr:   047C87C8

*** End of Error ***

Testing aborted - halt-on-error selected...

Stopping memory exerciser on ka7aa1 (id #77)
Stopping memory exerciser on ka7aa2 (id #79)

Done testing...

>>>
```

Example 4-6 Test Command — Use of Wildcard

```
>>> test dem*a*
Configuring system...
Testing dem*a*
Type Ctrl/C to abort

Initializing DEMNA0
Initializing DEMNA1
Initializing DEMFA0
DEMNA0 self-test passed
DEMNA1 self-test passed
DEMFA0 self-test passed
Starting network exerciser on exa0.0.0.4.0 in internal mode (id #144)
Starting network exerciser on exb0.0.0.5.0 in external mode (id #145)
Starting network exerciser on fxa0.0.0.2.1 in external mode (id #146)
Test time has expired...

Stopping network exerciser on exa0.0.0.4.0 (id #144)
Stopping network exerciser on exb0.0.0.5.0 (id #145)
Stopping network exerciser on fxa0.0.0.2.1 (id #146)
Done testing...

>>>
```

Example 4-7 Test Command — Test All Devices Associated with XMI0

```
>>> test xmi0 -omit demna2
Configuring system...
Testing xmi0
Type Ctrl/C to abort

KA7AA0 running module tests on DWLMA0
DWLMA0 module tests passed
Initializing DEMNA0
Initializing DEMNA1
Initializing CIXCD0
Initializing KDM700
Initializing DEMFA0
DEMNA0 self-test passed
DEMNA1 self-test passed
CIXCD0 self-test passed
KDM700 self-test passed
DEMFA0 self-test passed
Starting network exerciser on exa0.0.0.4.0 in internal mode (id #31)
Starting network exerciser on exb0.0.0.5.0 in external mode (id #32)
Starting network exerciser on fxa0.0.0.e.0 in external mode (id #33)
Starting device exerciser on dua0.0.0.6.0 (id #34)
Starting device exerciser on dub0.0.0.a.0 (id #35)
Starting device exerciser on dua1.1.0.6.0 (id #38)
Starting device exerciser on dub1.1.0.a.0 (id #39)
Starting device exerciser on dua2.2.0.6.0 (id #42)
Starting device exerciser on dub2.2.0.a.0 (id #43)
Starting device exerciser on dua3.3.0.6.0 (id #44)
Starting device exerciser on dub3.3.0.a.0 (id #45)
Test time has expired...

Stopping network exerciser on exa0.0.0.4.0 (id #31)
Stopping network exerciser on exb0.0.0.5.0 (id #32)
Stopping network exerciser on fxa0.0.0.e.0 (id #33)
Stopping device exerciser on dua0.0.0.6.0 (id #34)
Stopping device exerciser on dub0.0.0.a.0 (id #35)
Stopping device exerciser on dua1.1.0.6.0 (id #38)
Stopping device exerciser on dub1.1.0.a.0 (id #39)
Stopping device exerciser on dua2.2.0.6.0 (id #42)
Stopping device exerciser on dub2.2.0.a.0 (id #43)
Stopping device exerciser on dua3.3.0.6.0 (id #44)
Stopping device exerciser on dub3.3.0.a.0 (id #45)
Done testing...

>>>
```

4.2 Set Host Command — Running DUP-Based Diagnostics and Utilities

Example 4-8 Set Host Command — Running DUP-Based Diagnostics and Utilities

```
>>> show device kdm700
polling for units on kdm700, slot 12, xmi0...
dua32.0.0.12.0     DUA32                     RA70
dua34.0.0.12.0     DUA34                     RA70
dua77.0.0.12.0     DUA77                     RA70

>>> set host -dup dua32.0.0.12.0
dup: starting DIRECT on kdm70_a.0.0.12.0 ()

 DIRECT    1  D Directory Utility

 ILEXER    1  D InLine Exerciser

 Task? ilexer
 dup: starting ILEXER on kdm70_a.0.0.12.0 ()

 ***
 *** ILEXER (InLine Exerciser) V 001  *** 17-NOV-1992 10:21:57 ***
 ***

 Enable Bad Block Replacement (Y/N) [N] ?

 Available Disk Drives: D0032 D0034 D0077

 Available Tape Drives: NONE

 Select next drive to test (Tnnnn/Dnnnn) [] ? d0032
 Write enable drive (Y/N) [N] ?

 *** Available tests are:

 1. Random I/O
 2. Seek Intensive I/O
 3. Data Intensive I/O
 4. Oscillatory Seek
```

Example 4-8 Set Host Command — Running DUP-Based Diagnostics and Utilities (Continued)

```
Select test number (1:4) [1] ?
Select start block number (0:547040) [0] ?
Select end block number (0:547040) [547040] ? 500
Select data pattern number 0=ALL (0:15) [0] ?
Select another drive (Y/N) [] ?

*** No default is allowed.

Select another drive (Y/N) [] ? n
Select execution time limit, 0=Infinite, minutes (0:65535) [0] ? 1
Select report interval, minutes (0:65535) [1] ? 1
Select hard error limit (0:32) [0] ?
Report soft errors (Y/N) [N] ? y

Execution Performance Summary at 17-NOV-1992 10:23:57

D0032    193832346     4315      9713        0      0      0      0

Execution Performance Summary at 17-NOV-1992 10:23:57

D0032 *  193832346     4320      9723        0      0      0      0

***
*** ILEXER is exiting.
***

Task?
```

4.3 Set Host Command — Running Diagnostics on a Remote XMI Adapter

Example 4-9 Set Host Command — Running Diagnostics on a Remote XMI Adapter, Failing Case

```
>>> set host demna0
Connecting to remote node, ^Y to disconnect.
t/r

RBDE> ST0/TR

;Selftest     3.00

; T0001 T0002 T0003 T0004 T0005 T0006 T0007 T0008 T0009 T0010
; T0011 T0012 T0013 T0014 T0015 T0016 T0017 T0018

;       F        E     0C03        1
;      HE    XNAGA       XX    T0018
;      03 00000000 0000A000 00000000 20150004 20051D97 08

;       F        E     0C03        1
;      HE    XNAGA       XX    T0018
;      05 00020000 80020000 00000000 20150204 200524A4 01

;       F        E     0C03        1
;00000000 00000002 00000000 00000000 00000000 00000000 00000000

RBDE> ^Y
>>>
```

Example 4-10 Set Host Command — Running Diagnostics on a Remote XMI Adapter, Passing Case

```
>>> set h demna0
Connecting to remote node, ^Y to disconnect.
t/r

RBDE> ST0/TR

;Selftest     3.00

; T0001 T0002 T0003 T0004 T0005 T0006 T0007 T0008 T0009 T0010
; T0011 T0012 T0013 T0014 T0015 T0016 T0017 T0018

;       P        E     0C03        1
;00000000 00000000 00000000 00000000 00000000 00000000 00000000

RBDE> ^Y
>>>
```

Chapter 5

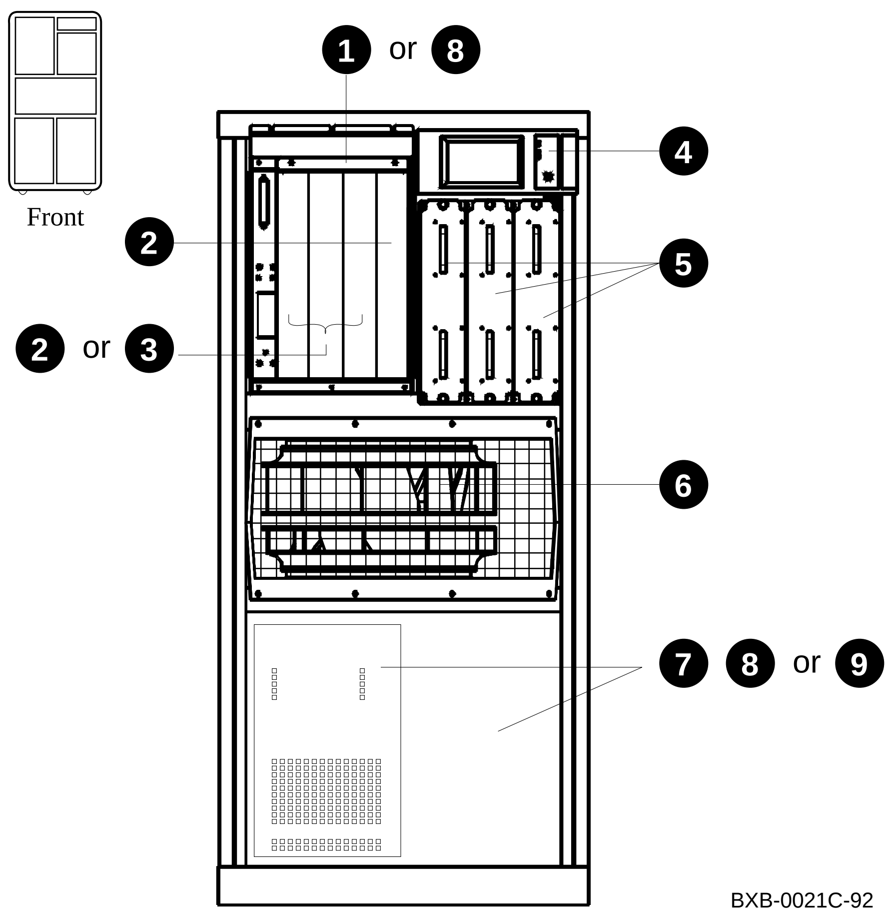
FRU Locations

This chapter shows the location of these field-replaceable units:

- FRUs Common to Every Platform
  - — FRUs Accessible from the Front of the Cabinet
  - — FRUs Accessible from the Rear of the Cabinet
- Platform Cables
- FRUs in the XMI Plug-In Unit
- FRUs in the Disk Plug-In Unit
- FRUs in the Battery Plug-In Unit

5.1 FRUs Common to Every Platform

Figure 5-1 Platform Cabinet (Front) Showing FRU Locations



❶	70–28574–01	LSB centerplane and card cage [1, 2]
❷	E2045–AA	CPU module
❸	E2043–AA or E2043–BA or E2043–CA or E2046–AA	Memory module 64 Mbytes [3] Memory module 128 Mbytes [3] Memory module 256 Mbytes [3] Memory module 512 Mbytes [3]
❹	54–20306–01	Control panel [2]
❺	30–33796–01 or 30–33796–02	Power regulator
❻	12–35173–01	Blower [1]
❼	DWLMA–AA/BA	XMI plug-in unit [1] (see page 5-8 for FRUs in this PIU)
❽	BA654–AA	Disk plug-in unit [3, 4] (see page 5-10)
❾	H7237–AA	Battery plug-in unit [1] (see page 5-12)

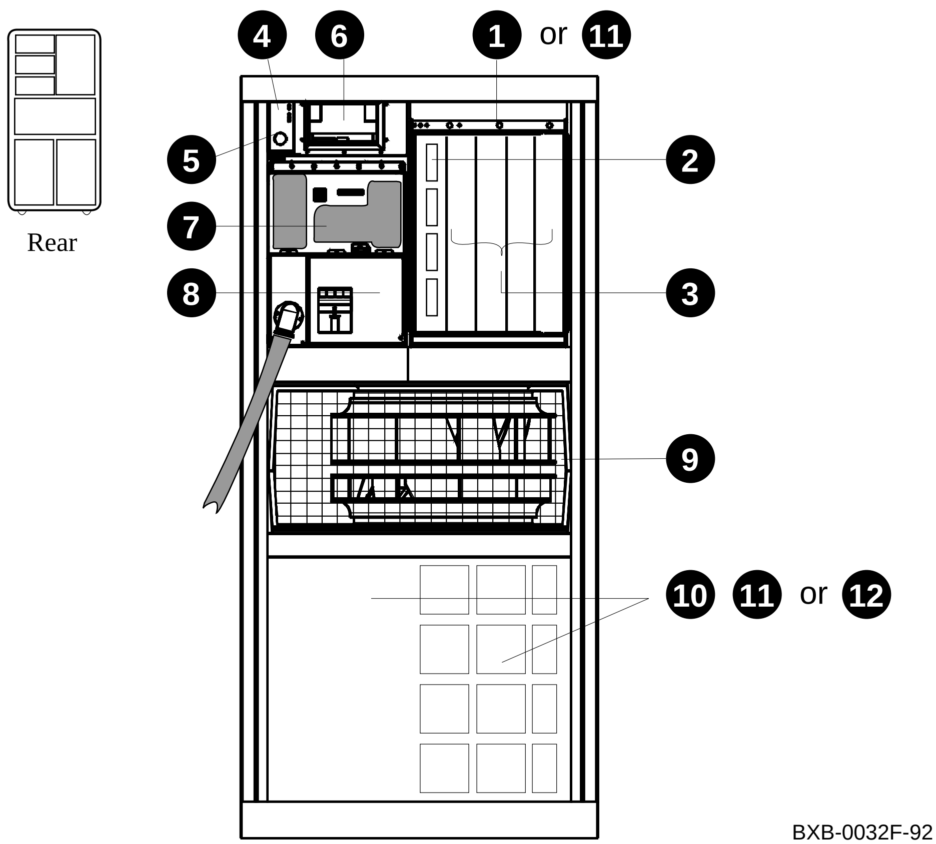
[1] Removal and replacement of this FRU requires access to both the front and the rear of the cabinet.

[2] This FRU is in the main cabinet only (cannot be located in the expander cabinet).

[3] This FRU can be located in either the front or the rear of the cabinet.

[4] This FRU can be located in the top portion (front or rear) only in the expander cabinet.

Figure 5-2 Platform Cabinet (Rear) Showing FRU Locations



1	70–28574–01	LSB centerplane and card cage [1, 2]
2	E2044–AA	IOP module
3	E2043–AA or E2043–BA or E2043–CA or E2046–AA	Memory module 64 Mbytes [3] Memory module 128 Mbytes [3] Memory module 256 Mbytes [3] Memory module 512 Mbytes [3]
4	54–20300–01	Cabinet control logic module (CCL)
5	54–36203–04	CCL pressure sensor
6	TF85–AA	Removable media device [1]
	Includes these FRUs:	
	TK85	Disk drive
	54–19089–01	DSSI controller module
	54–20868–01	Local disk converter
	17–03123–01	LDC to CCL signal
	17–03164–01	LDC to TF power +5/+12
	17–03348–01	DSSI signal to bulkhead (TK85)
	17–03443–01	Power LDC to bulkhead
	17–03444–01	Signal LDC to bulkhead
	17–03448–01	DSSI bus TF to bulkhead
	17–03505–01	5V VTERM power
	17–03508–01	48V power regulator to bulkhead
7	30–35143–01	DC distribution box
8	30–33798–01 or 30–33798–02 or 30–33798–03	AC input box
9	12–35173–01	Blower [1]
10	DWLMA–AA/BA	XMI plug-in unit [1] (see page 5-8)
11	BA654–AA	Disk plug-in unit [3, 4] (see page 5-10)
12	H7237–AA	Battery plug-in unit [1] (see page 5-12)

1 Removal and replacement of this FRU requires access to both the front and the rear of the cabinet.

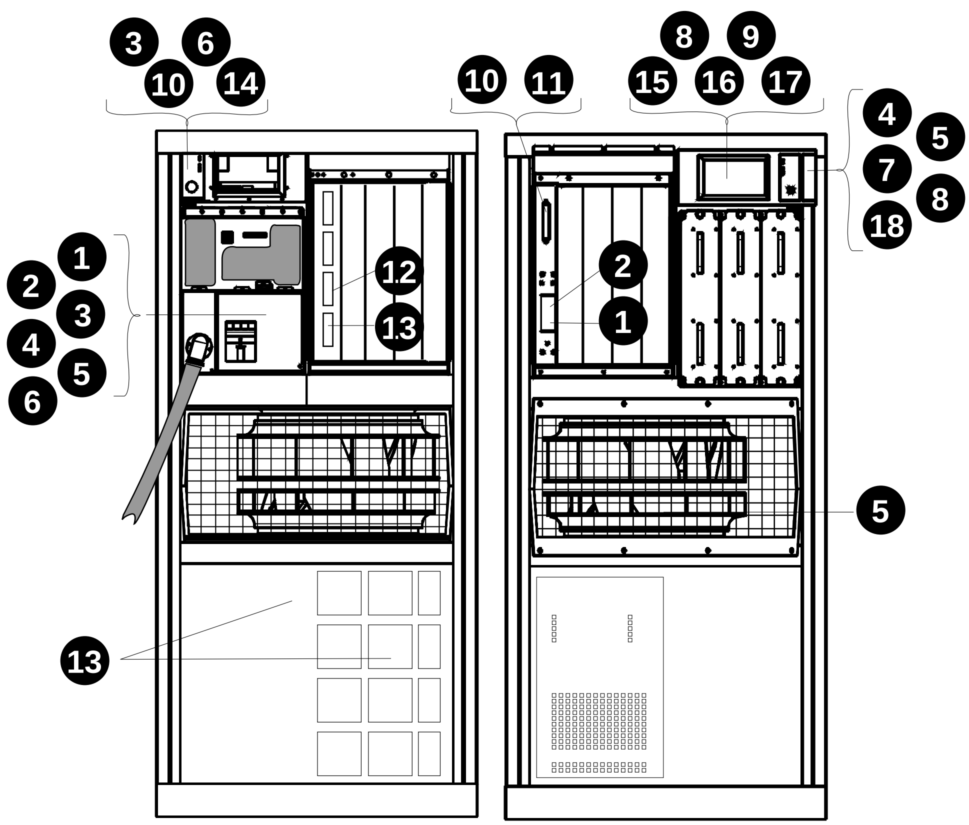
2 This FRU is in the main cabinet only (cannot be located in the expander cabinet).

3 This FRU can be located in either the front or the rear of the cabinet.

4 This FRU can be located in the top portion (front or rear) only in the expander cabinet.

5.2 Platform Cables

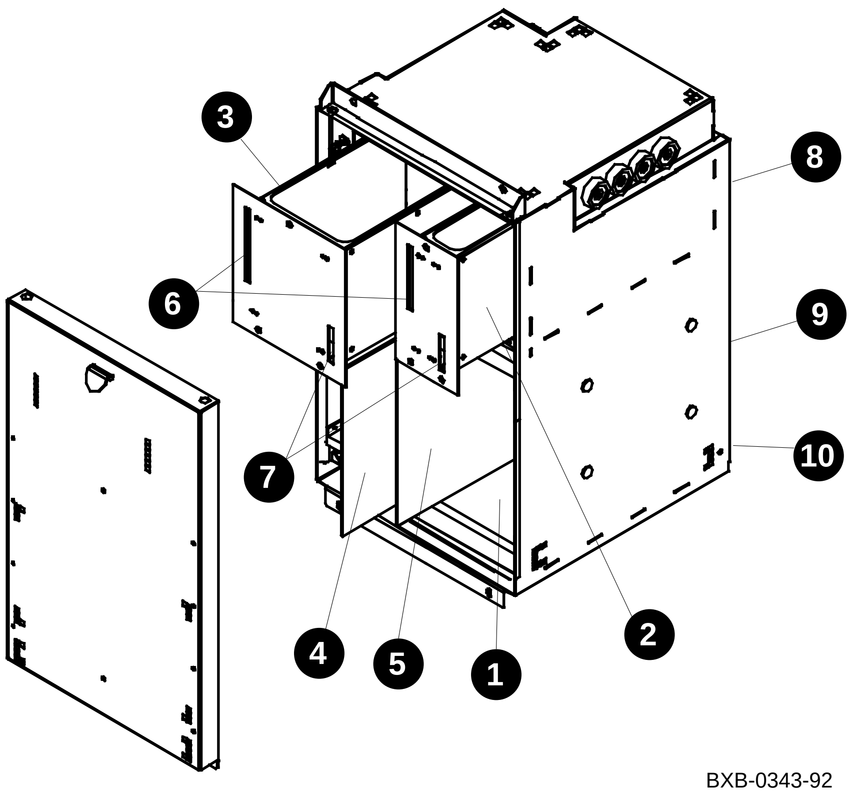
Figure 5-3 Platform Cabinet (Rear and Front) Showing Cables



❶	17–03118–01	48V LSB power (gray)
❷	17–03118–02	48V LSB power (yellow)
❸	17–03119–01	48V power/signal to PIU
❹	17–03127–01	AC to LDC
❺	17–03126–01	48V power/sense to blower
❻	17–03124–01	AC to CCL signal
❼	17–03120–01	Control panel to CCL signal
❽	17–03123–01	LDC to CCL signal
❾	17–03164–01	+5/+12 LDC to tape power
❿	17–03121–01	CCL to LSB bulkhead signal
⓫	17–03122–01	LSB bulkhead to LSB backplane
⓬	17–03085–01	I/O cable, long (to expander cabinet — 114 in)
⓭	17–03085–02	I/O cable, short (53 in)
⓮	17–03201–01	DEC power bus
⓯	17–03348–01	DSSI bulkhead signal
⓰	17–03443–01	LDC bulkhead power
⓱	17–03444–01	LDC bulkhead signal
⓲	17–03511–01	Control panel to CCL in expander cabinet

5.3 FRUs in the XMI Plug-In Unit

Figure 5-4 XMI Plug-In Unit (Front) Showing FRU Locations

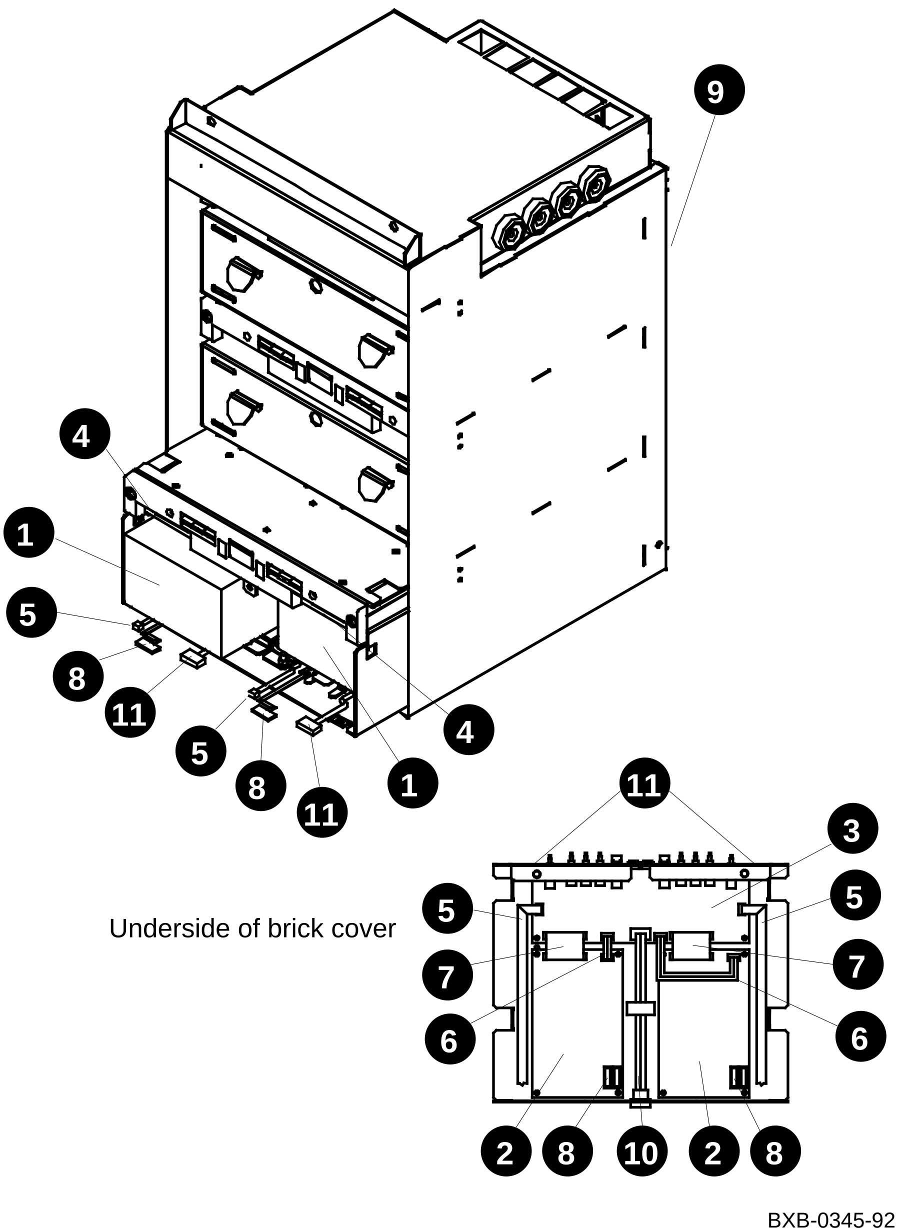


❶	70–30396–01	XMI backplane assembly
❷	30–36010–01	Module A (power regulator)
❸	30–36009–01	Module B (power regulator)
❹	T2028–AA	DWLMA module (LSB to XMI — slot 8)
❺	T2030–YA	Clock and arbitration module (slot 7)
	These FRUs can reside in any[1] XMI slot except 7 or 8:	
	T2020–00	XMI to NI controller
	T2027–00	XMI to FDDI controller
	T2080–YA	XMI to CI controller
	T2036–AA	XMI to DSSI controller
❻	17–03162–01	Signal cable
❼	17–03163–01	48V power cable
❽	17–03202–01	Power distribution cable (rear of PIU)
❾	17–03416–01	+5VB jumper (rear of PIU)
❿	17–03533–01	Bulkhead to XMI signal (rear of PIU)

[1] A module with an XMI corner must be in slot 1 or 14. For more information, see the *VAX 7000 Platform Service Manual*.

5.4 FRUs in the Disk Plug-In Unit

Figure 5-5 Disk Plug-In Unit (Front) Showing FRU Locations



❶	RF73–EA	RF73 disk drive
	Includes these FRUs:	
	54–19119–01	RF73–EA ECM module
	70–28814–01	RF73 HDA
❷	54–20868–01	Local disk converter (LDC)
❸	54–21664–01	Disk control panel
❹	17–02382–0x	DSSI brick jumper cable (BC21Q-xx)
❺	17–03417–01	RF73 signal
❻	17–03418–01	LDC power
❼	17–03419–01	LDC signal
❽	17–03420–01	RF73 power
❾	17–03422–01	Signal and power
❿	17–03423–01	Disk control panel to bulkhead
⓫	17–03424–01	DSSI bus

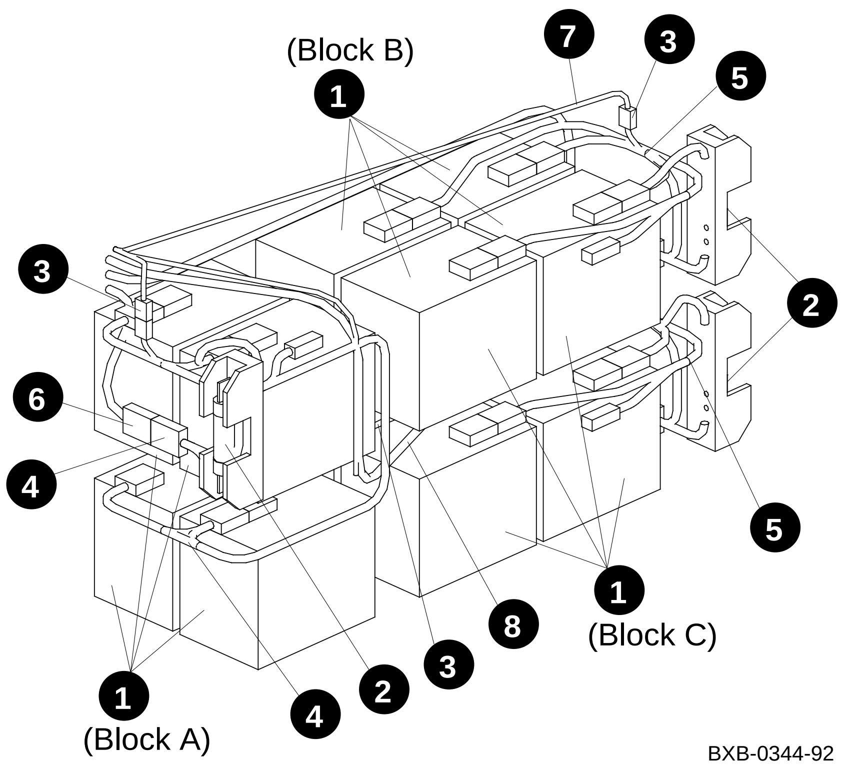
❶ through ❸, ❺ through ❽, ❿, and ⓫ are in each brick.

❹ connects the bricks to each other.

❾ runs up the center rear of the PIU.

5.5 FRUs in the Battery Plug-In Unit

Figure 5-6 Battery Plug-In Unit (Rear) Showing FRU Locations



NOTE: The battery plug-in unit is shown in Figure 5-6 without its enclosure.

❶	12–36168–02	Battery
❷	12–39982–01	Fuse (LPN–RK–90)
❸	17–03421–01	Battery sensor cable
❹	17–03492–01	Intermediate cable, battery block A
❺	17–03493–01	Intermediate cable, battery block B or C
❻	17–03494–01	Power regulator A to battery block A
❼	17–03494–02	Power regulator B to battery block B
❽	17–03494–03	Power regulator C to battery block C

Chapter 6

Controls and Indicators

This chapter describes controls and indicators on these system components:

- Control Panel
- TF85 Removable Media Device
- Cabinet Control Logic Module
- IOP Module
- KA7AA Processor Module
- Power Regulator
- AC Input Box
- BA651 XMI PIU Power Regulators
- DWLMA Module
- BA654 Disk PIU

6.1 Control Panel

Figure 6-1 Control Panel

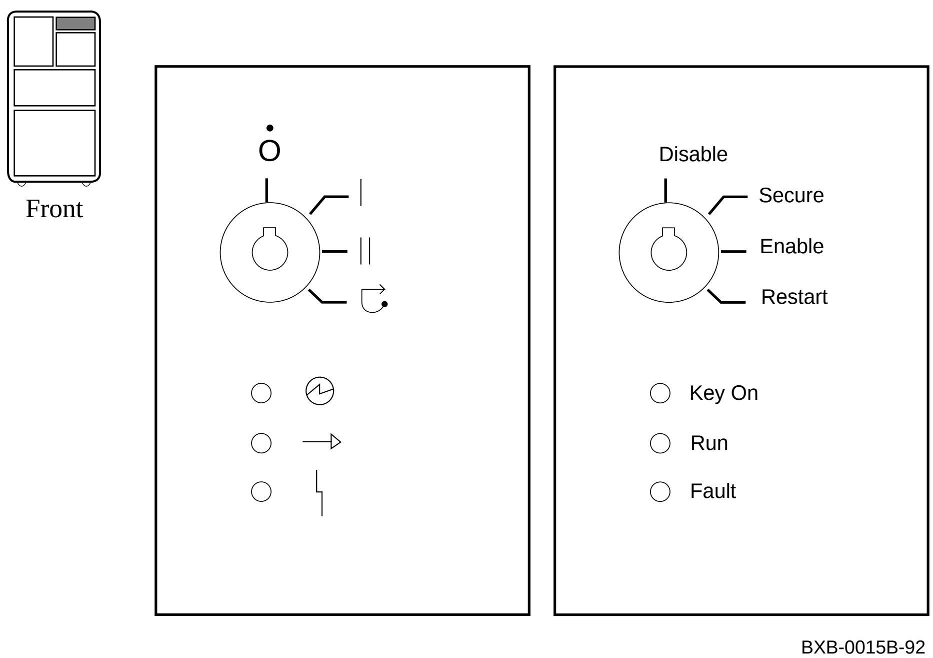


Table 6-1 Control Panel Indicator Lights

Light	State	Meaning
Key On	On	Power supplied to entire system; blower running.
(Green)	Off	Power supplied only to CCL module.
Run	On	Primary processor is running the operating system or user programs.
(Green)	Off	Primary processor is in console mode.
Fault	On	Fault on LSB, XMI, or an I/O bus.
(Yellow)	Slow flash	Power sequencing in progress or airflow error.
	Fast flash	Power system error, airflow error, or detected transition to keyswitch in Disable position.
	Off	The system passed self-test.

6.2 TF85 Removable Media Device

Figure 6-2 TF85 Controls and Indicators

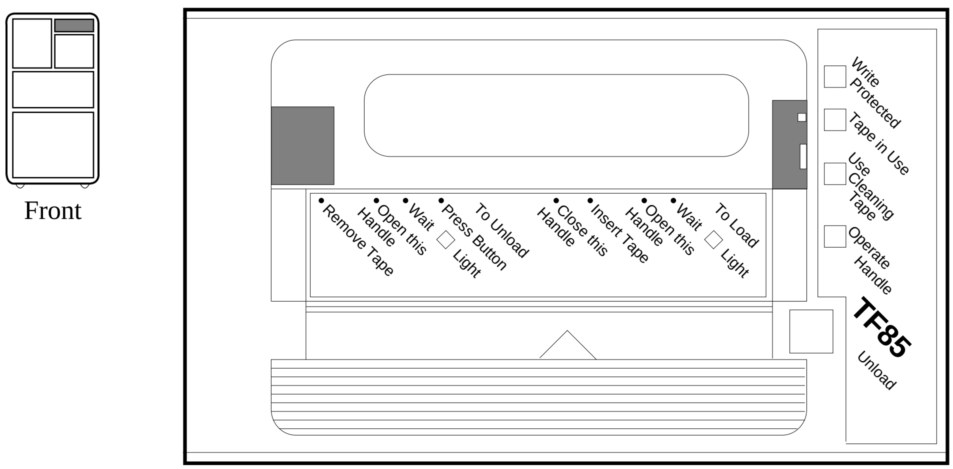


Table 6-2 TF85 Lights

Light	Color	State	Meaning
Write Protected	Orange	On Off	Tape write protected Tape write enabled
Tape in Use	Yellow	Steady Blinking	Drive ready Drive in use
Use Cleaning Tape	Orange	On Off	Drive needs cleaning No cleaning needed
Operate Handle	Green	On Off Blinking	OK to operate handle Do not operate handle Defective cartridge. Pull handle to the open position and remove cartridge. Try another cartridge.
All four lights		Blinking	Drive fault. Reset by pressing the Unload button.

6.3 Cabinet Control Logic Module

Figure 6-3 CCL Module LEDs

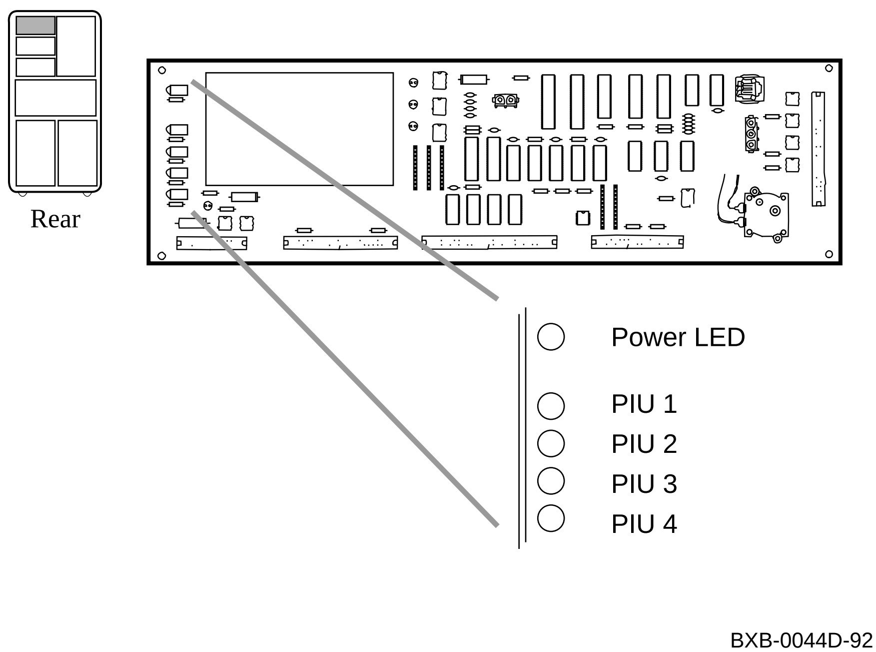


Table 6-3 CCL Module LEDs

LED	Meaning
Power LED	Power is present on the CCL module.
PIU 1 – 4	Power is present in the PIU regulators in the quadrant indicated. (Q1 is to the left when viewing the cabinet from the front, Q2 is behind Q1, Q3 is in the front right, and Q4 is behind Q3.)

6.4 IOP Module

Figure 6-4 IOP (E2044-AA) Module LED

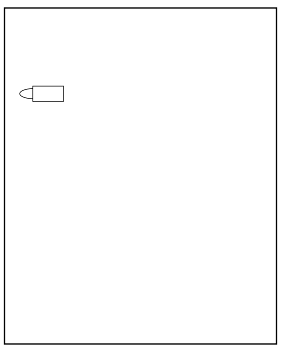


Table 6-4 IOP (E2044-AA) Module LED

Condition	Meaning
On	One of the following: • All IOP-specific and I/O adapter tests passed. • An I/O adapter test failed, and the error was isolated to the adapter.
Off	One of the following: • An IOP-specific test failed. • An I/O adapter test failed, and the error could not be isolated to the adapter. • The processor module failed.

6.5 KA7AA Processor Module

Figure 6-5 Processor (E2045) LEDs After Self-Test

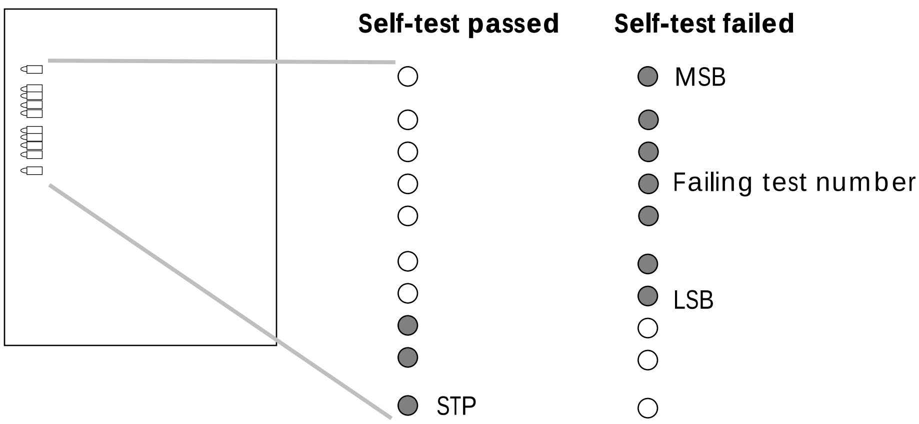


Table 6-5 Processor (E2045) LEDs After Self-Test

Test Result	LEDs	
Self-test passed — boot processor	STP LED and two LEDs above it are on. All others are off.	
Self-test passed — secondary processor	STP LED and one LED above it are on. All others are off.	
Self-test failed	STP LED and two LEDs above it are off. Failing test number[1] is in top seven LEDs:	
	1 – 55	SROM/self-test tests 1 – 55
	56 – 65	CPU/memory interaction tests 1 – 10
	66 – 72	Multiprocessor tests 1 – 7

[1] The failing test number is in binary-coded decimal.

Table 6-6 Self-Test LEDs Indicating Defective DC-to-DC Converter

Processor Modules	Memory Modules	IOP Module	Defective Converter on This Module
One module's STP LED is off; all others are on.	All STP LEDs are on.	STP LED is off.	Processor module with STP LED off
All STP LEDs are on.	One module's STP LED is off; all others are on.	STP LED is off.	Memory module with STP LED off
All STP LEDs are on.	All STP LEDs are on.	STP LED is off.	IOP module

Each module on the LSB has an on-board DC-to-DC converter. If the converter on one module is defective, the 2V reference voltage is disabled for all nodes, preventing any node from using the LSB. Table 6-6 indicates which module has the defective converter based on the state of the STP LEDs of all modules in the LSB.

Use Table 6-6 when the Fault light on the control panel is on (see Section 6.1) and the console prompt is displayed but the self-test map is not. This indicates that the LSB is good, but access to the bus is not possible.

6.6 Power Regulator

Figure 6-6 Power Regulator LEDs

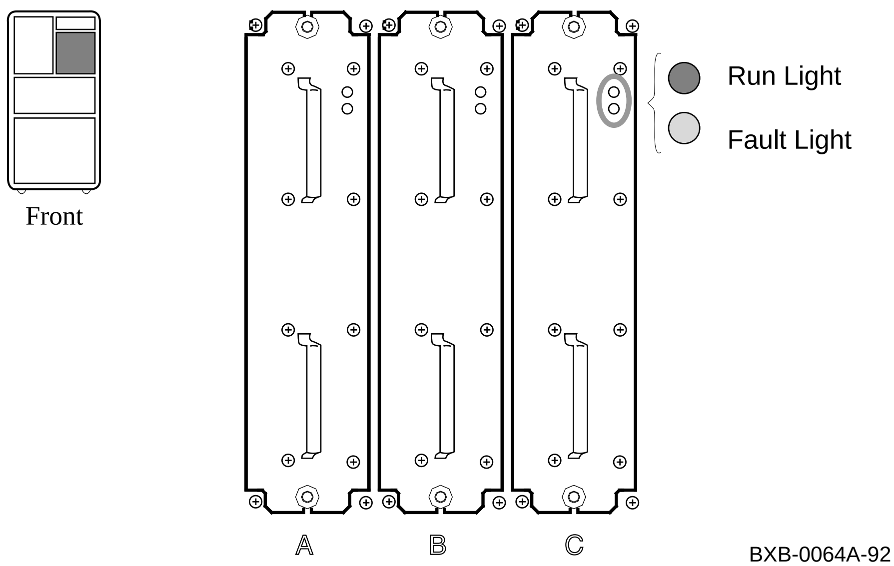


Table 6-7 Power Regulator Lights

Run Light (Green)	Fault Light (Yellow)	Meaning
Off	Off	No AC power
Off	On	Fatal fault
Fast flash	Off	AC power present and keyswitch in Disable position
On	Fast flash	Nonfatal fault or battery at end of life
On	Slow flash	Battery discharge mode
On	Off	Normal operation

6.7 AC Input Box

Figure 6-7 AC Input Box — Indicators on Circuit Breaker

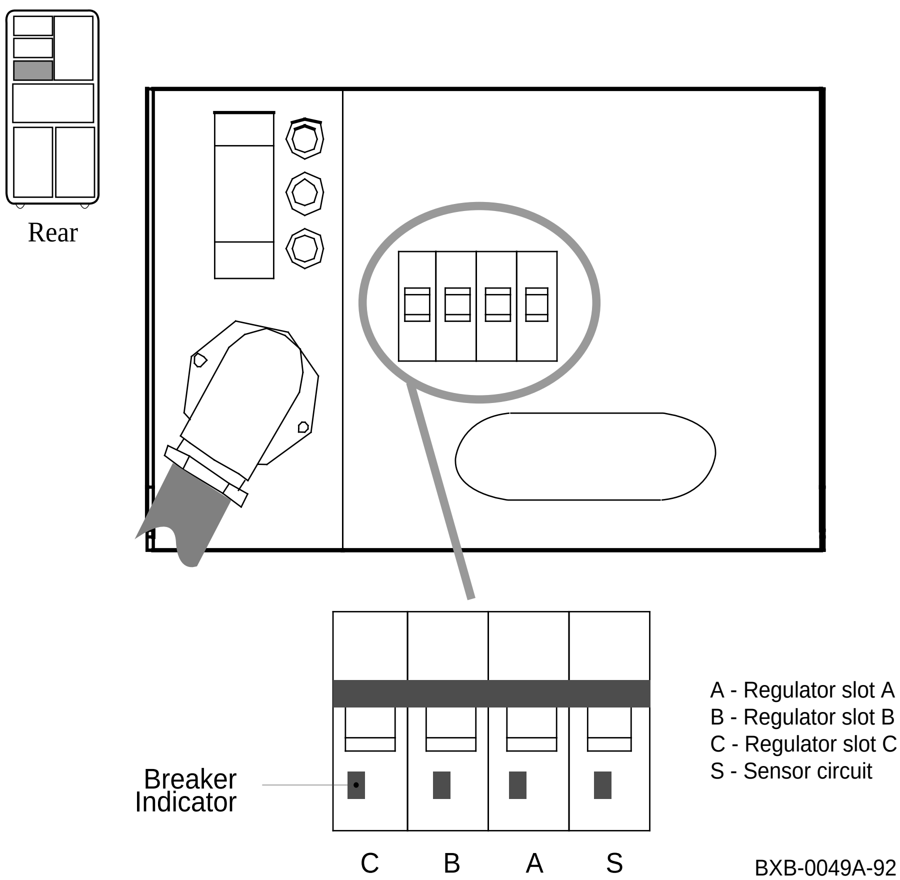


Table 6-8 AC Input Box — Indicators on Circuit Breaker

Color	Meaning
Red	Pole is in on position; not tripped.
Green	Pole is in off position or tripped due to an overload.

NOTE: In the Japanese version (30–33798–03), all poles trip if one does, causing all indicators to turn green.

6.8 BA651 XMI PIU Power Regulators

Figure 6-8 XMI PIU Power Regulators

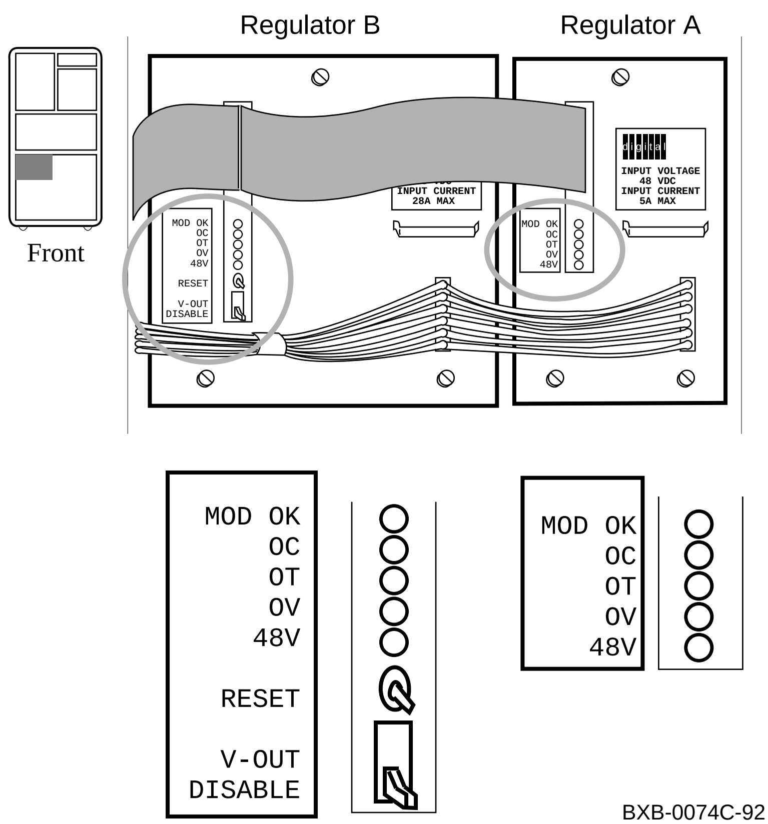


Table 6-9 XMI PIU Power Regulator Lights (Regulators A and B)

Light	Color	State	Meaning	Does light latch?
MOD OK	Green	On	Regulator is working.	No
		Off	Regulator is not working.	
OC	Yellow	On	Overcurrent condition	Yes
OT	Yellow	On	Overtemperature condition	Yes
OV	Yellow	On	Overvoltage condition	Yes
48V	Green	On	48V is present.	No

Table 6-10 XMI PIU Power Switches (Regulator B)

Switch	Function
Reset	Momentary switch resets all lights on regulators A and B.
Enable/Disable	When this switch is in the Disable position, the output of both PIU power supplies is inhibited.

6.9 DWLMA Module

Figure 6-9 DWLMA (T2028-AA) Module LEDs

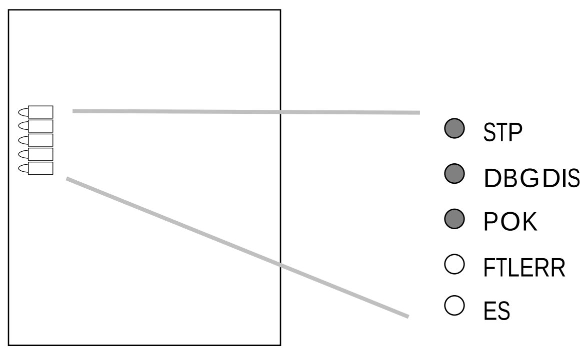


Table 6-11 DWLMA (T2028-AA) Module LEDs

LED	Color	Desired Condition
STP — Self-Test Passed	Yellow	On
DBGDIS — Debug Disable	Green	On
POK — Power OK	Green	On
FTLERR — Fatal Error	Red	Off
ES — Error Summary	Red	Off

6.10 BA654 Disk PIU

Figure 6-10 Disk Brick Control Panel

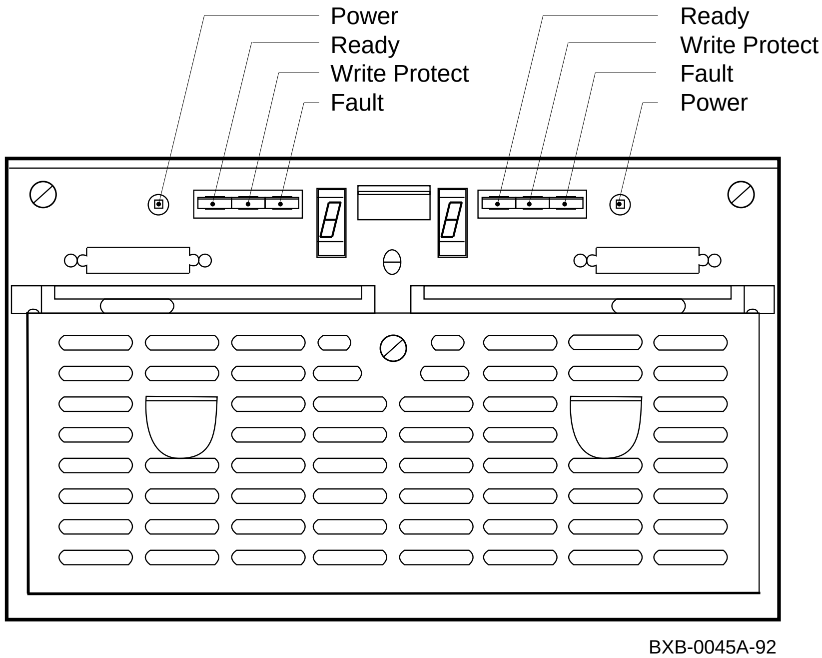


Table 6-12 Disk Brick Controls and Indicators

Control	Pushbutton Position	Light	Function
Power (Green)	In Out	On Off	DC power present DC power not present
Ready (Green)	In Out	On Off	ISE is on-line ISE is off-line
Wrt Prot (Yellow)	In Out	On Off	Write-protect enabled Write-protect disabled
Fault (Red)	Momentary switch	On Off Slow flash Fast flash	Fault condition Normal operation ISE calibrations in progress Disk control panel failure

Chapter 7

Restoring Corrupted ROMs

The following list tells you how to determine when to use these sections of this chapter:

- Restoring a Corrupted EEPROM

  Use this section when the message "EEPROM image failed to verify" is displayed on the console terminal.

- Restoring Corrupted Firmware on an Adapter

  Use this section when an adapter fails self-test and the problem is corrupted firmware.

- Restoring Corrupted Firmware on a CPU

  Use this section when you power up the system and the prompt VAX-7000/10000-FRRC> is displayed on the console terminal.

7.1 Restoring a Corrupted EEPROM

Example 7-1 Using the Build EEPROM Command to Restore a Corrupted EEPROM

```
EEPROM image failed to verify
EEPROM environment parameters not set up
Fail to update EEPROM envar on CPU 1
>>> build eeprom
Creating new EEPROM image
System Serial Number> gao1234567
Module Serial Number> sgo0000001
Module Unified 2-5-2-4 Part Number> 80-E2045-AA-0E04
Module Firmware Revision> 1.00
>>> initialize
```

NOTE: See Chapter 3 for more information on the console commands for the EEPROM.

For more information:

VAX 7000 System Service Manual
VAX 7000 Console Reference Manual

7.2 Restoring Corrupted Firmware on an Adapter

If an adapter fails self-test, use this procedure to determine if the firmware is corrupted, and if it is, to update the firmware:

1. Boot the console CD-ROM (Example 7-2).
2. Use the LFU **display** or **show** command to indicate (by returning the mnemonic "unknown") if firmware has been corrupted (Example 7-3).
3. Use the LFU **update** command to write the new firmware (Example 7-4).
4. Exit (Example 7-5).

Example 7-2 Booting LFU

```
>>> boot exa0 -file ISL_LVAX_V01
resulting file is mopdl:ISL_LVAX_V01/exa0
 ...... Load complete!
      [boot information]
Network Initial System Load Function
Version 1.1
FUNCTION   FUNCTION
ID
1     -         Display Menu
2     -         Help
3     -         Choose Service
4     -         Select Options
5     -         Stop
Enter a function ID value: 3
OPTION               OPTION
ID
1     -         Find Services
2     -         Enter known Service Name
Enter an Option ID value: 1

Working
Servers found: 3
Service Name Format:
Service Number
Service Name
Server Name
Ethernet ID
#1
INFO4$RZ57
INFO4
08-00-2B-26-A6-98
#2
6000_DIAG_H
```

Example 7-2 Booting LFU (Continued)

```
INFO3
08-00-2B-16-04-D4
#3
VAX7000_V01
OPUS_ESS
08-00-2B-18-A9-75
Enter a Service Number or <CR> for more: 3

             Copyright Digital Equipment Corporation
                              1992
                      All Rights Reserved.
  Loadable Environment Rev: V1.0-1625    Jul 12 1992  10:50:56

          ***** Loadable Firmware Update Utility *****
           Version 2.01                 16-jun-1992

----------------------------------------------------------------
  Function      Description
----------------------------------------------------------------

  Display      Displays the system's configuration table.
  Exit         Return to loadable offline operating environment.
  List         Lists the device types and firmware revisions
               supported by this revision of LFU.
  Modify       Modifies port parameters and device attributes.
  Show         Displays device mnemonic, hardware and firmware
               revisions.
  Update       Replaces current firmware with loadable data
               image.
  Verify       Compares loadable and device images.
  ? or Help    Scrolls the function table.
----------------------------------------------------------------
Function?
```

Example 7-3 LFU Display and Show Commands

```
Function? disp
      Name   Type    Rev   Mnemonic  FW Rev   HW Rev
LSB
0+    KA7AA  (8002)  0000  ka7aa0     1.00     E04
7+    MS7AA  (4000)  0000  ms7aa1      N/A     A01
8+    IOP    (2000)  0001  iop0        N/A       A

C0 XMI                     xmi0
8+    DWLMA  (102A)  A5A6  dwlma0      N/A       A
C+    KDM70  (0C22)  1E11  kdm700     3.00
E+    DEMNA  (0C03)  060B  demna0     6.08

C1 XMI                     xmi1
1+    ?????  (0000)  0000  unknown0
8+    DWLMA  (102A)  A5A6  dwlma1      N/A       A
A+    CIXCD  (0C05)  EB11  cixcd0    69.00     A01

Function? sho *

               Firmware        Hardware
               Revision        Revision

ka7aa0  +      1.00             E04
ms7aa0          --               --         not supported.
iop0            --               --         not supported.
xmi0            --               --         not supported.
kdm700         3.00        Cannot be read
demna0          --               --         not supported.
unknown0        --               --          Updates only.
cixcd0  +     69.00             A01

           '+' indicates the update firmware revision
               is greater than the adapter's firmware revision.

Function?
```

Example 7-4 LFU Update Command

```
Function? update unknown0
Enter device name or 'exit' to skip this device.
Device name? cixcd
Hardware revision? A01
WARNING: updates may take several minutes to complete for each device
                            DO NOT ABORT!
unknown0 Updating to 70.00... Reading Device... Verifying 70.00...
PASSED.

Function?
```

Example 7-5 LFU Exit Command

```
Function? exit

Initializing...

F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
                     A  M  .  .  .  .  .  P  P  TYP
                     o  +  .  .  .  .  .  +  +  ST1
                     .  .  .  .  .  .  .  E  B  BPD
                     o  +  .  .  .  .  .  +  +  ST2
                     .  .  .  .  .  .  .  E  B  BPD
                     +  +  .  .  .  .  .  +  +  ST3
                     .  .  .  .  .  .  .  E  B  BPD

   .  .  .  .  +  .  +  .  +  .  .  .  +  .     C0 XMI +
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C1
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C2
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C3

                     . A0  .  .  .  .  .  .  .  ILV
                     .128  .  .  .  .  .  .  .  128Mb
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
>>>
```

For more information:

VAX 7000 System Service Manual
VAX 7000 Operations Manual

7.3 Restoring Corrupted Firmware on a CPU

Use this procedure when the prompt VAX-7000/10000-FRRC> appears at the console terminal after power-up. (This prompt appears only if the console terminal is set at 9600 baud.) This prompt indicates that the firmware in the FEPROMs on the processor module has been corrupted.

The following must be available for you to use this procedure:

- A source system that can logically connect, through the console port, to the system that has the corrupted firmware.
  - — The source system can be on site or remote.
  - — The source system must have access to an InfoServer.
  - — The program Kermit must reside on the source system.
- The VAX 7000 console CD-ROM with the file VAX7000_10000_CONSOLE_IMAGE.GROM.

Do the following to restore the corrupted firmware. All work is done at the source system, and the procedure takes approximately 10 minutes.

1. Set up the source system (Example 7-6):
   a. Set the speed of the terminal at which you are working to 9600 baud.
   b. Bind the CD-ROM volume name to a virtual disk container.
   c. Mount the InfoServer.
2. Make a physical connection from the source system to the system with the corrupted firmware. For example, use an RS232 cable to connect from a DMB32 on the source system to the console port on the system with the corrupted firmware.
3. Run Kermit (Example 7-7) and set the parameters as shown in the response to the **show all** command in the example.
4. Connect to the system with the corrupted firmware and downline load the correct code (Example 7-8).

Example 7-6 Preparing the Source System to Restore Corrupted Firmware on a CPU

```
$ set term/speed=9600/perm txa3:
$ mcr ess$ladcp
LADCP> bind VAX7000_V01
VAX7000_V01 is bound to DAD104
LADCP> exit
$ mount/ov=id dad104
$ dir dad104:[sys0.sysexe]

Directory DAD104:[SYS0.SYSEXE]

VAX7000_1000_CONSOLE_IMAGE.GROM
```

Example 7-7 Running Kermit and Setting Parameters

```
$ kermit
Kermit-32> set file type binary
Kermit-32> set retry packet 5
Kermit-32> set send time 5
Kermit-32> show all
VMS Kermit-32 version 3.3.111

  Block check type              One character checksum
  Debugging                     OFF
  Delay                         5 (sec)
  Server sends NAKs every 75 seconds while waiting for a
command
  Escape character              035 (octal)
  File type                     BINARY
  File naming                   Normal form
  Handshaking character         None
  Incomplete file disposition   Discard
  Line used                     (Optional)
  Local echo                    OFF
  Parity type                   None

Retry maximums

  Initial connection            5 (dec)
  Sending a packet              5 (dec)

Send parameters

  Packet length                 80 (dec)
  Padding length                0 (dec)
```

Example 7-7 Running Kermit and Setting Parameters (Cont)

```
  Padding character              000 (octal)
  Time out                       5 (sec)
  End of line character          015 (octal)
  Quoting character              043 (octal)
  Start of packet                001 (octal)
Receive parameters
  Packet length                  80 (dec)
  Padding length                 0 (dec)
  Padding character              000 (octal)
  Time out                       5 (sec)
  End of line character          015 (octal)
  Quoting character              043 (octal)
  8-bit quoting character        046 (octal)
  Start of packet                001 (octal)
Transmit parameters
  Delay                          0.0 (sec)
  Echo                           OFF
  Repeat quoting character       176 (octal)
```

Example 7-8 Downline Loading Code to Corrupted FEPROMs

```
Kermit-32> connect txa5:
VAX-7000/10000-FRRC> r        !Prepare system to receive
VAX-7000/10000-FRRC> Ctrl/] C !Return to Kermit
Kermit-32> send vax7000_10000_console_image.grom
                              !Transmit code
Kermit-32> connect            !Reconnect to target system
VAX-7000/10000-FRRC> c        !Verify checksum of image
VAX-7000/10000-FRRC> p        !Copy program image to
                              !FEPROMs
VAX-7000/10000-FRRC> i        !Reset node
VAX-7000/10000-FRRC> Ctrl/] C !Return to Kermit
Kermit-32> exit               !Return to DCL
$
```

For more information:

VAX 7000 System Service Manual

Chapter 8

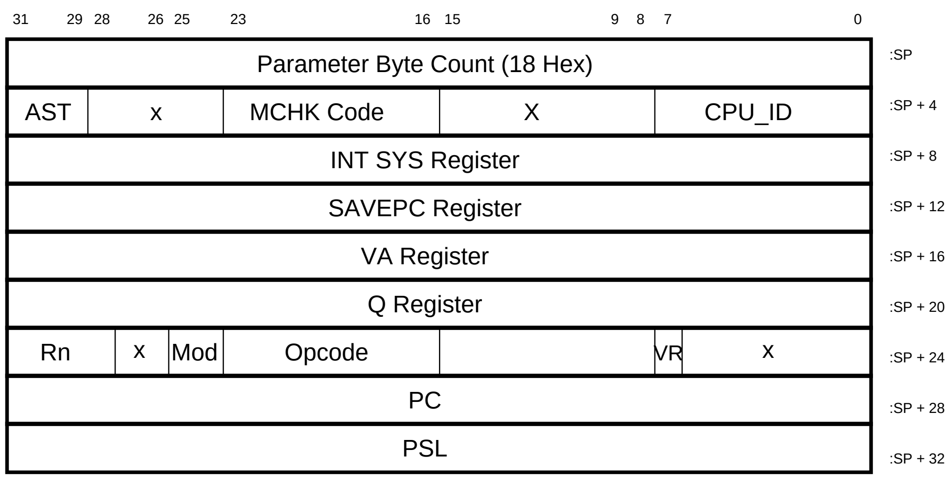
System Errors

This chapter includes information on the machine check frame and the parse trees. Sections include:

- Machine Check Frame
- Machine Check Parse Tree
- Hard Error Parse Tree
- Soft Error Parse Tree
- I/O Port Parse Tree
- DWLMA Parse Tree

8.1 Machine Check Frame

Figure 8-1 Machine Check Frame



BXB-0196-92

For more information:

KA7AA CPU Technical Manual
VAX 7000 Advanced Troubleshooting

Table 8-1 Machine Check Frame Parameters

Longword	Bits	Contents
SP+0	<31:0>	Byte count. The size of the stack frame in bytes, not including the PC, PSL, or the byte count longword. Stack frame PC and PSL values should always be referenced using this count as an offset from the stack pointer.
SP+4	<31:29>	AST LVL. The current value of the register.
	<23:16>	Machine check code. The reason for the machine check, as listed in Table 8-2.
	<7:0>	CPUID. Contains the current value of the CPUID register.
SP+8	<31:0>	INT.SYS register. The value of the INT.SYS register, which is read onto the A-bus by the microcode.
SP+12	<31:0>	SAVEPC register. The SAVEPC register, which is loaded by microcode with the PC value in certain circumstances. It is used in error handling for PTE read errors with PSL <FPD> set in this stack frame.
SP+16	<31:0>	VA register. The contents of the Ebox VA register, which may be loaded from the output of the ALU.
SP+20	<31:0>	Q register. The contents of the Ebox Q register, which may be loaded from the output of the shifter.
SP+24	<31:28>	Rn. The value of the Rn register, which is used to obtain the register number for the CVTPL and EDIV instructions. In general, the value of this field is unpredictable.
	<25:24>	Mod. A copy of the currrent mode field, PSL <CUR_MOD>.
	<23:16>	Opcode. Bits <7:0> of the instruction opcode. The FD bit is not included.

Table 8-1 Machine Check Frame Parameters (Continued)

Longword	Bits	Contents
	<7>	VR. The VAX Restart bit, which is used to communicate restart information between the microcode and the operating system. When set, this bit indicates that no architectural state has been changed by the instruction that was executing when the error was detected. When clear, it indicates that architectural state was modified by the instruction.
SP+28	<31:0>	PC. The value of the program counter at the time of the fault.
SP+32	<31:0>	PSL. The value of the processor status longword at the time of the fault.

Table 8-2 Machine Check Codes in the Stack Frame

Code	Description	Restart Condition
01	Unknown memory management fault parameter returned by Mbox	(VR[1] = 1) or (PSL<FPD>[2] = 1)
02	Illegal interrupt ID value returned in INT.SYS	(VR = 1) or (PSL<FPD> = 1)
03	Illegal microcode dispatch	(VR = 1) or (PSL<FPD> = 1)
04	Illegal combination of state bits detected during string instruction	(PSL<FPD> = 1)
05	Asynchronous hardware error	Recovery is generally not possible.
06	Synchronous hardware error	Recovery and retry are possible.

[1] VR is the VAX restart bit in the machine check stack frame.
[2] FPD (First Part Done) is PSL <27>.

8.2 Machine Check Parse Tree

Figure 8-2 Machine Check Parse Tree

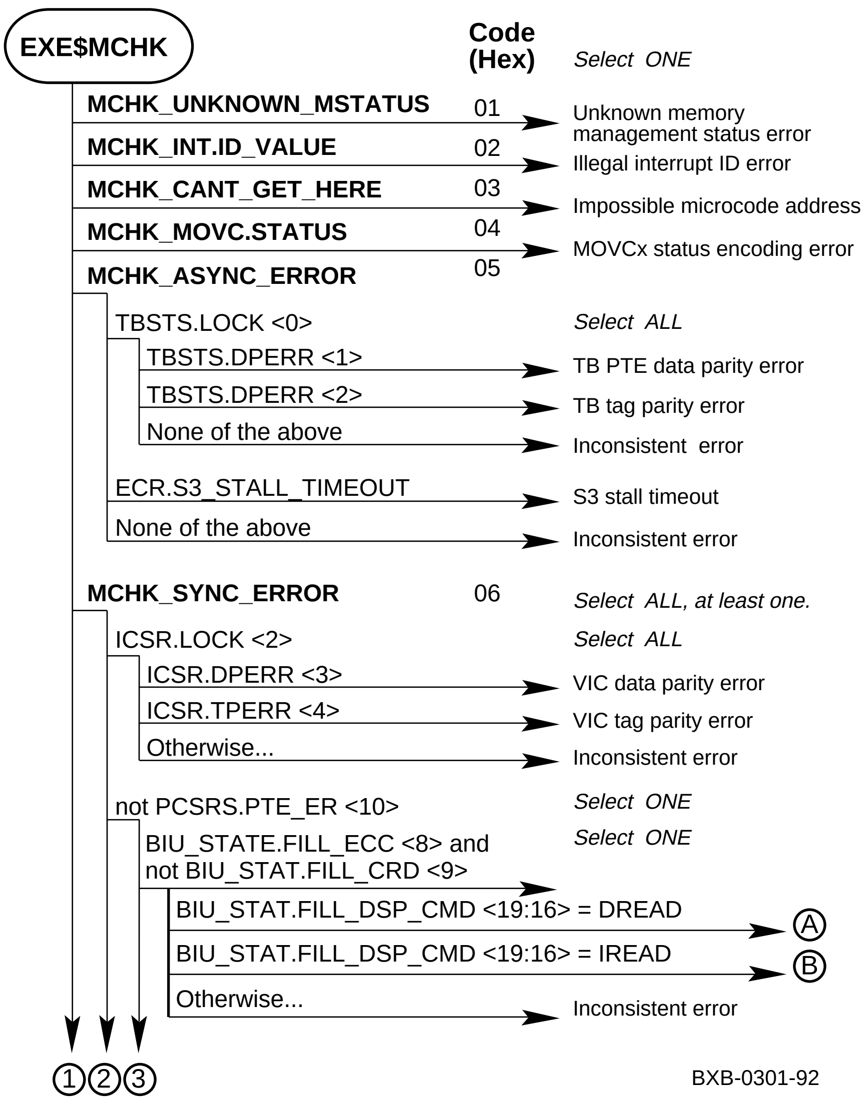


Figure 8-2 Machine Check Parse Tree (Continued)

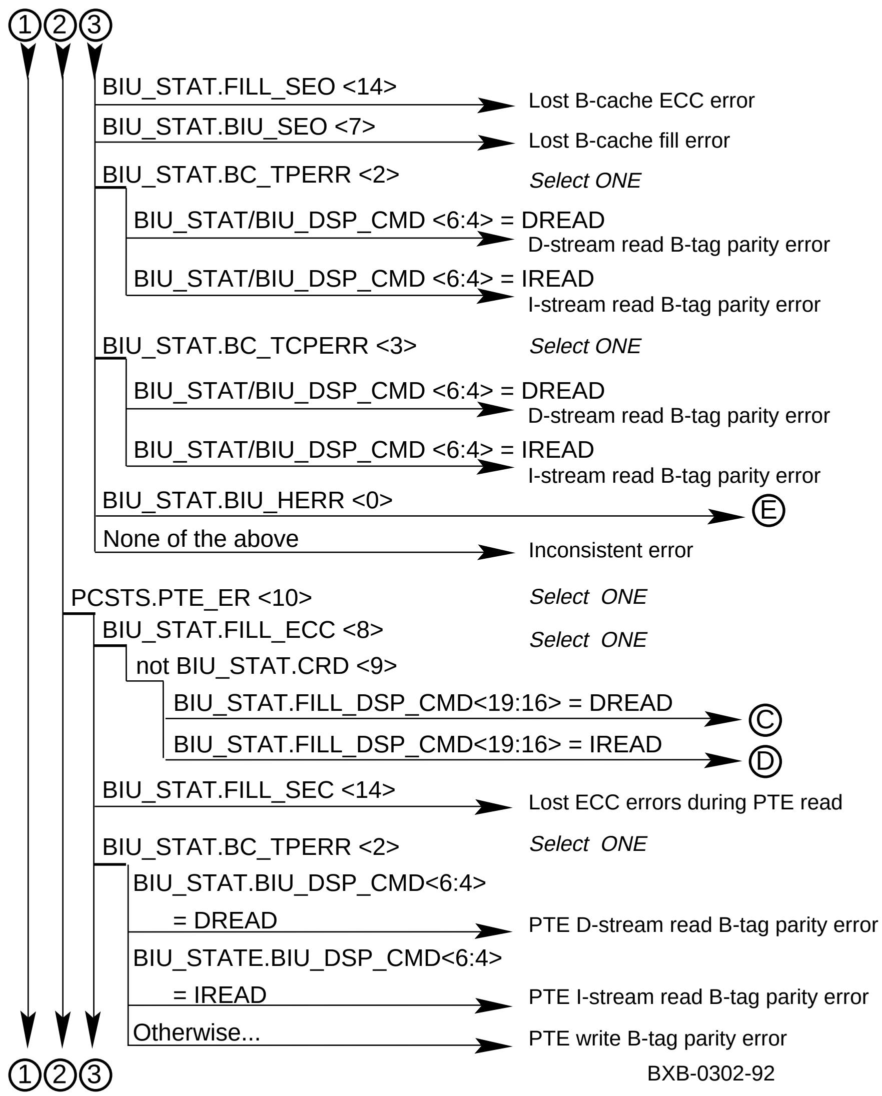


Figure 8-2 Machine Check Parse Tree (Continued)

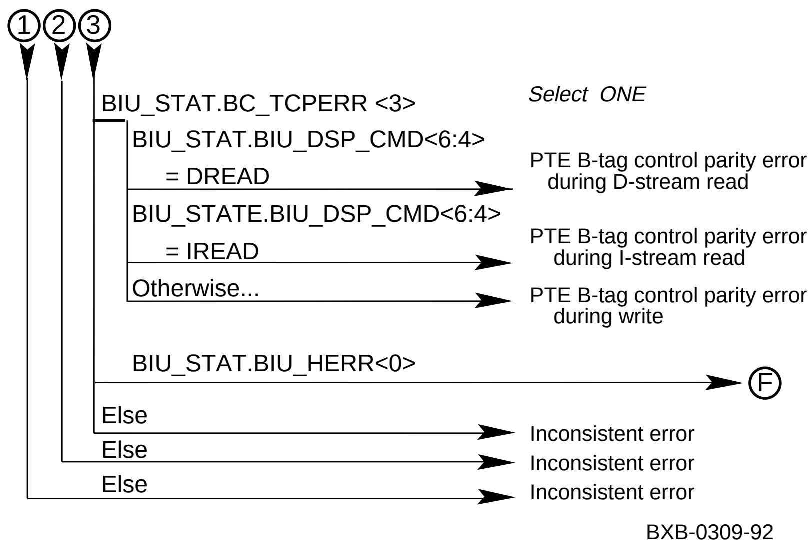


Figure 8-2 Machine Check Parse Tree (Continued)

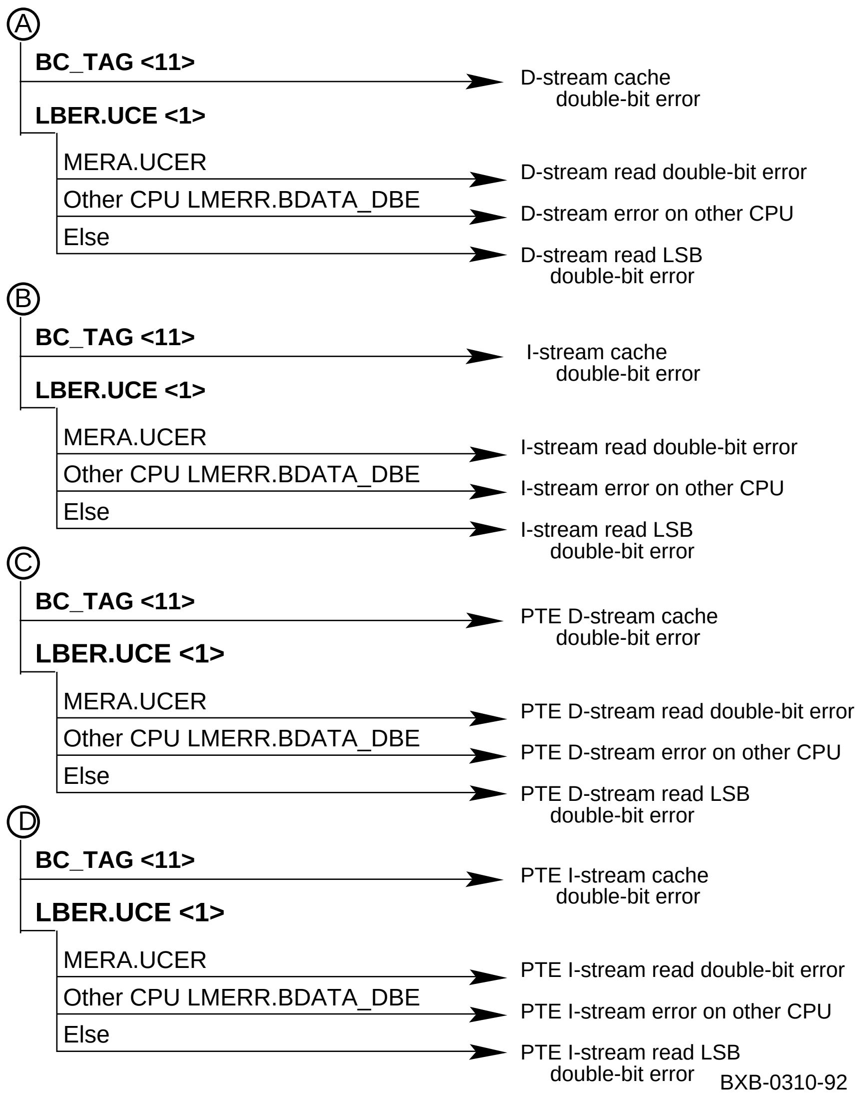


Figure 8-2 Machine Check Parse Tree (Continued)

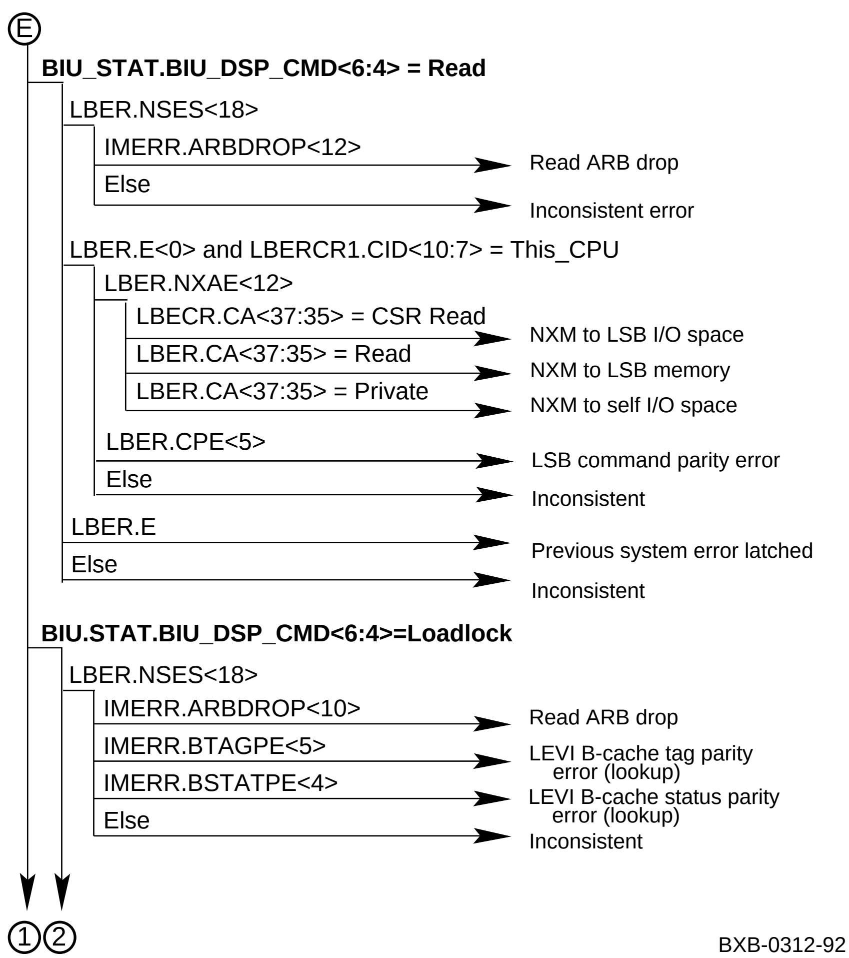


Figure 8-2 Machine Check Parse Tree (Continued)

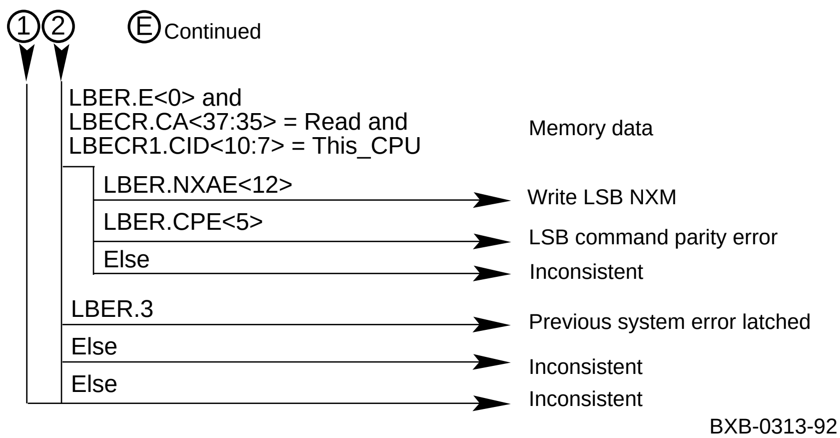
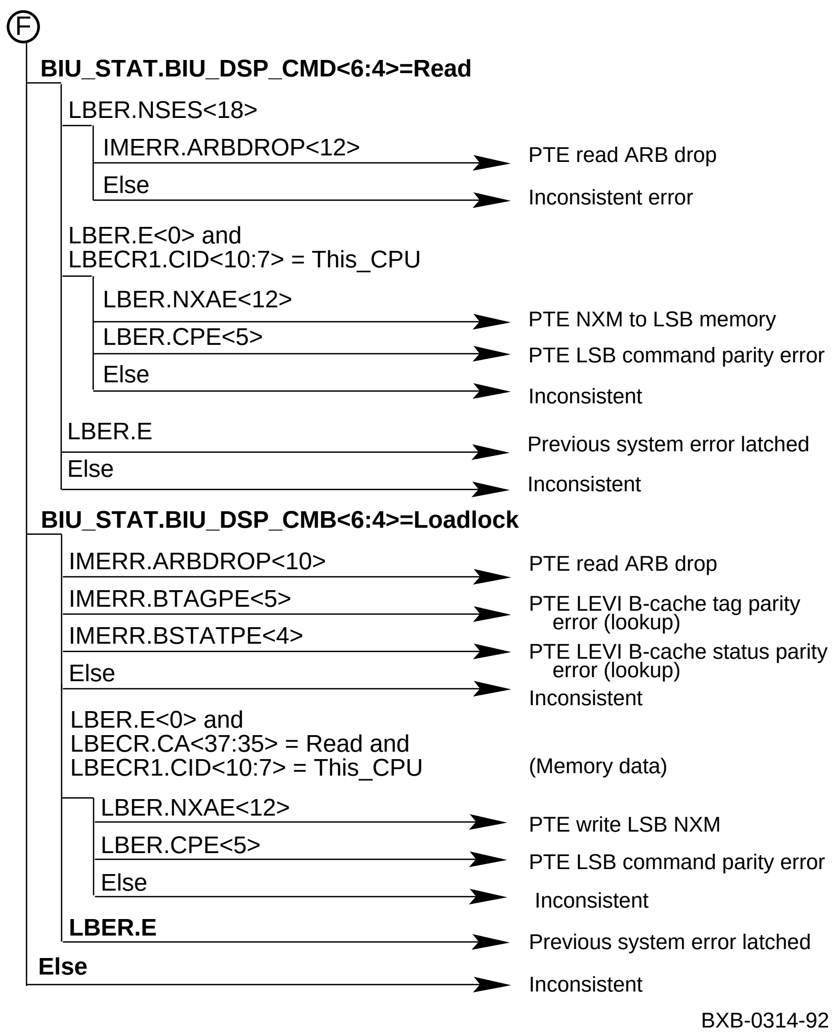


Figure 8-2 Machine Check Parse Tree (Continued)



8.3 Hard Error Parse Tree

Figure 8-3 Hard Error Parse Tree

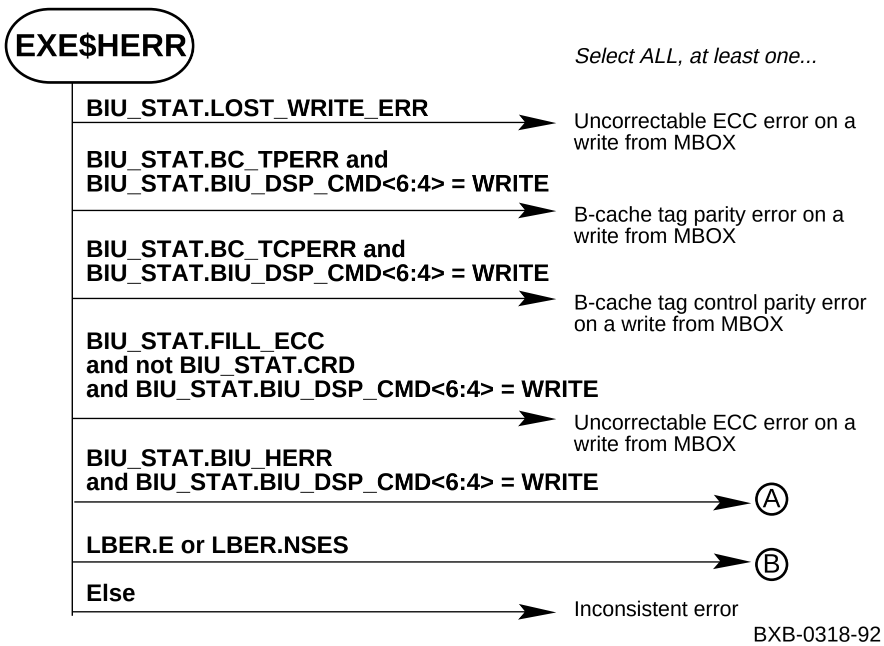


Figure 8-3 Hard Error Parse Tree (Continued)

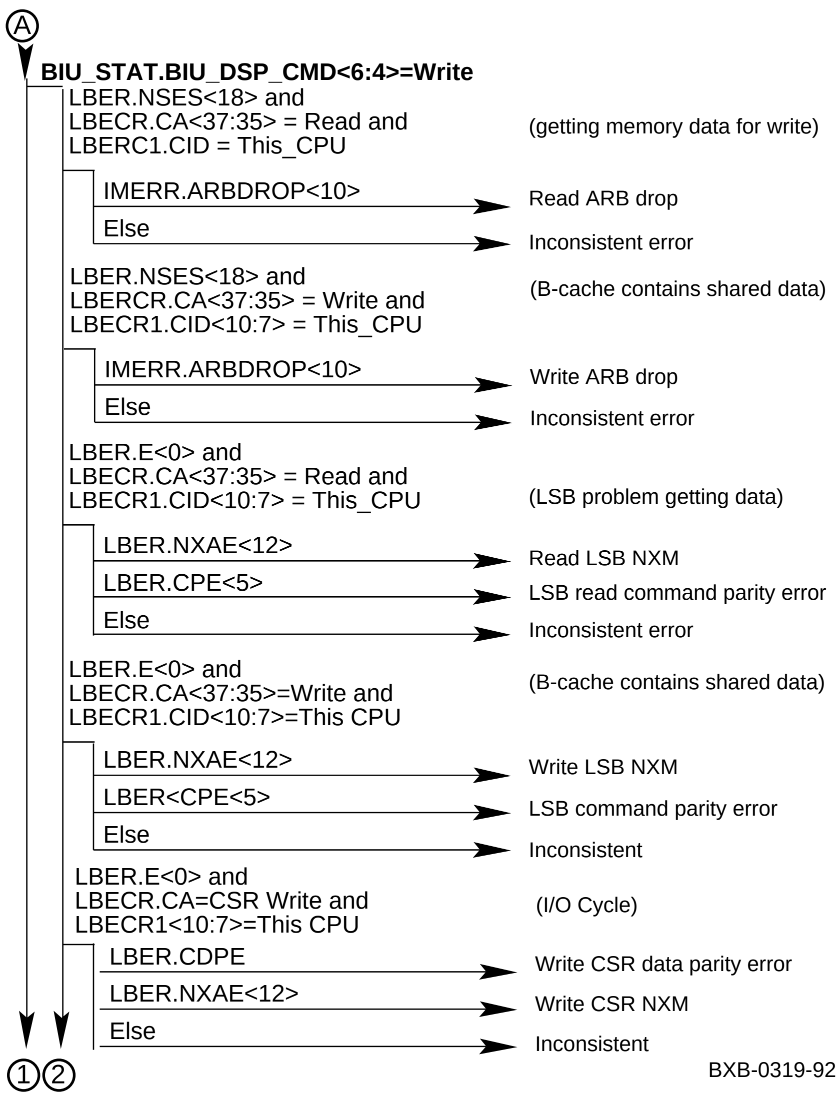


Figure 8-3 Hard Error Parse Tree (Continued)

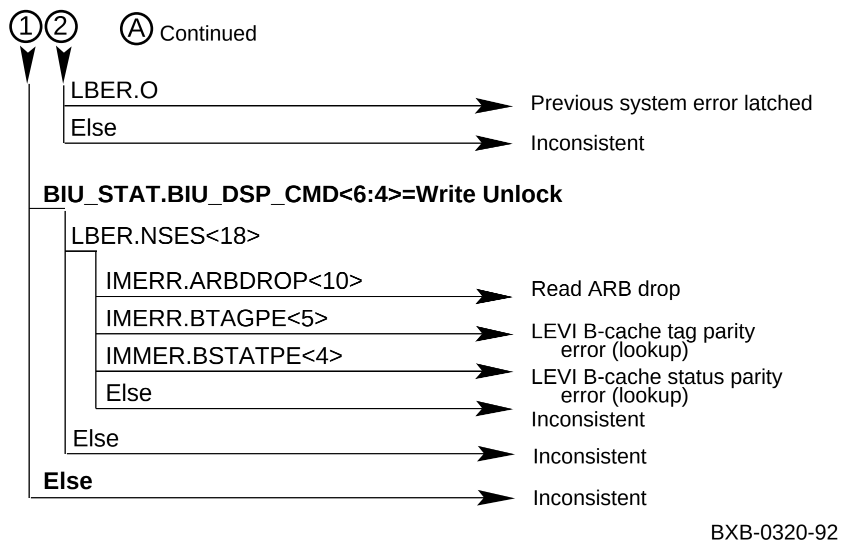


Figure 8-3 Hard Error Parse Tree (Continued)

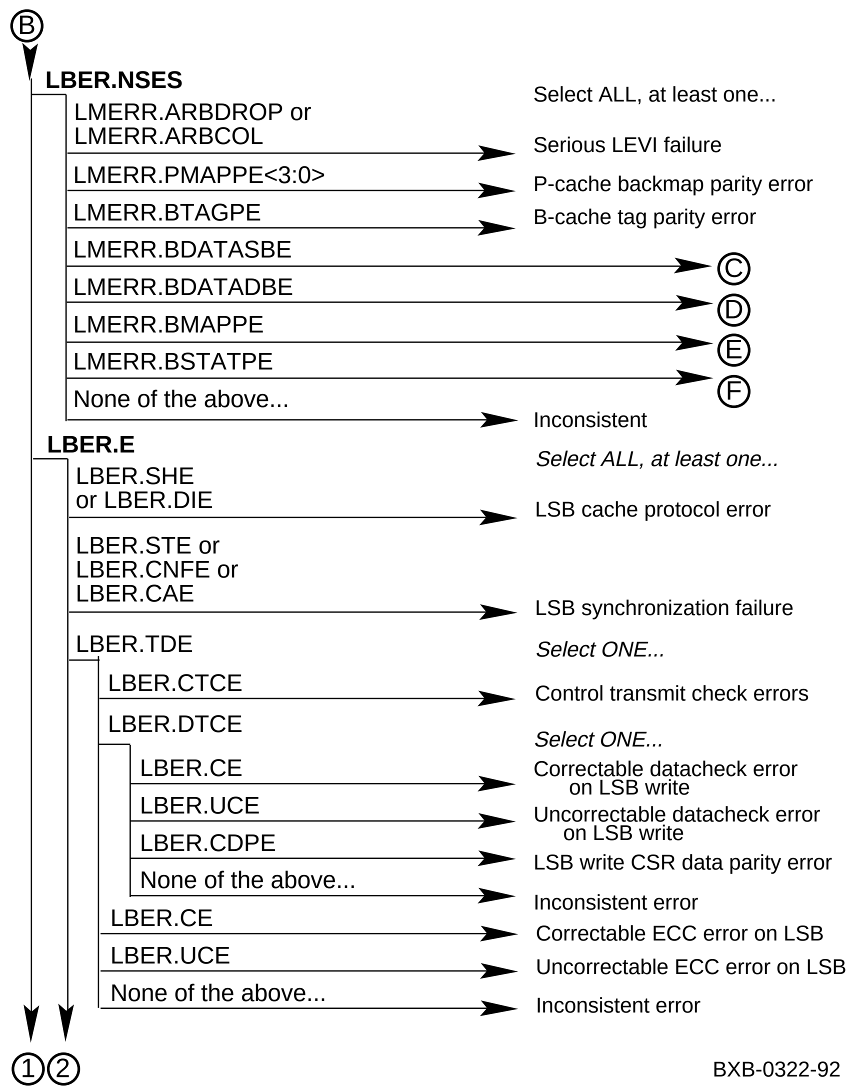


Figure 8-3 Hard Error Parse Tree (Continued)

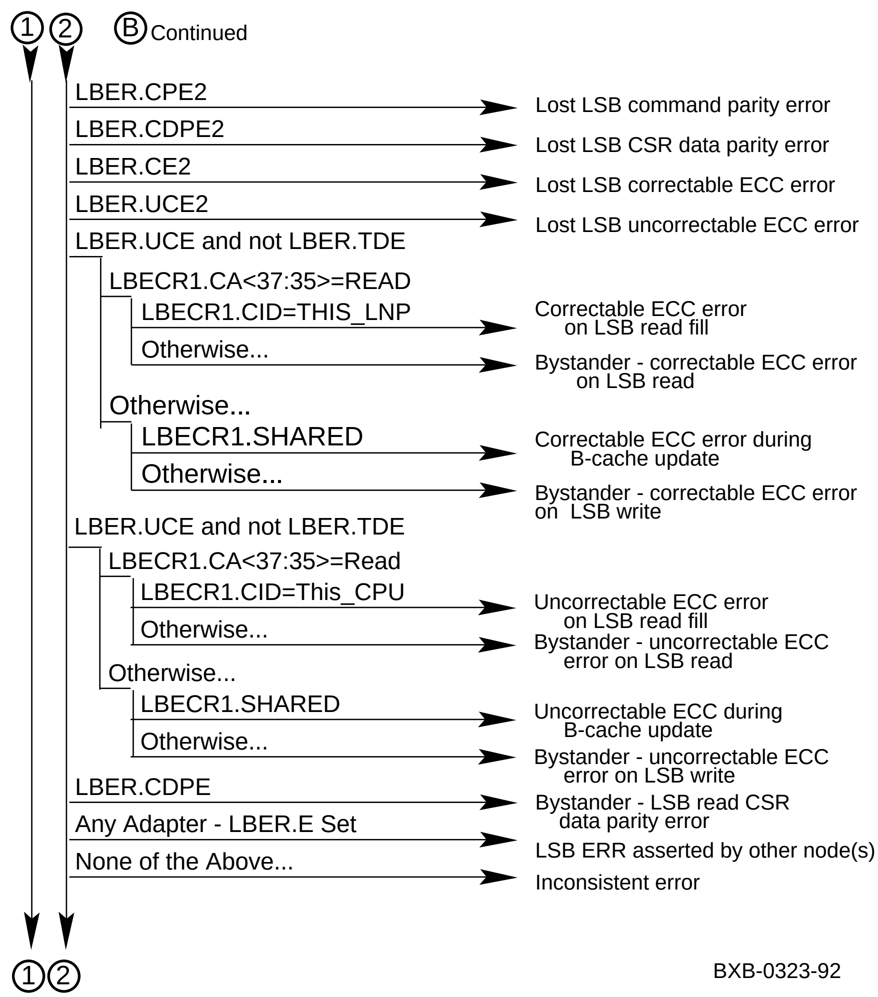


Figure 8-3 Hard Error Parse Tree (Continued)

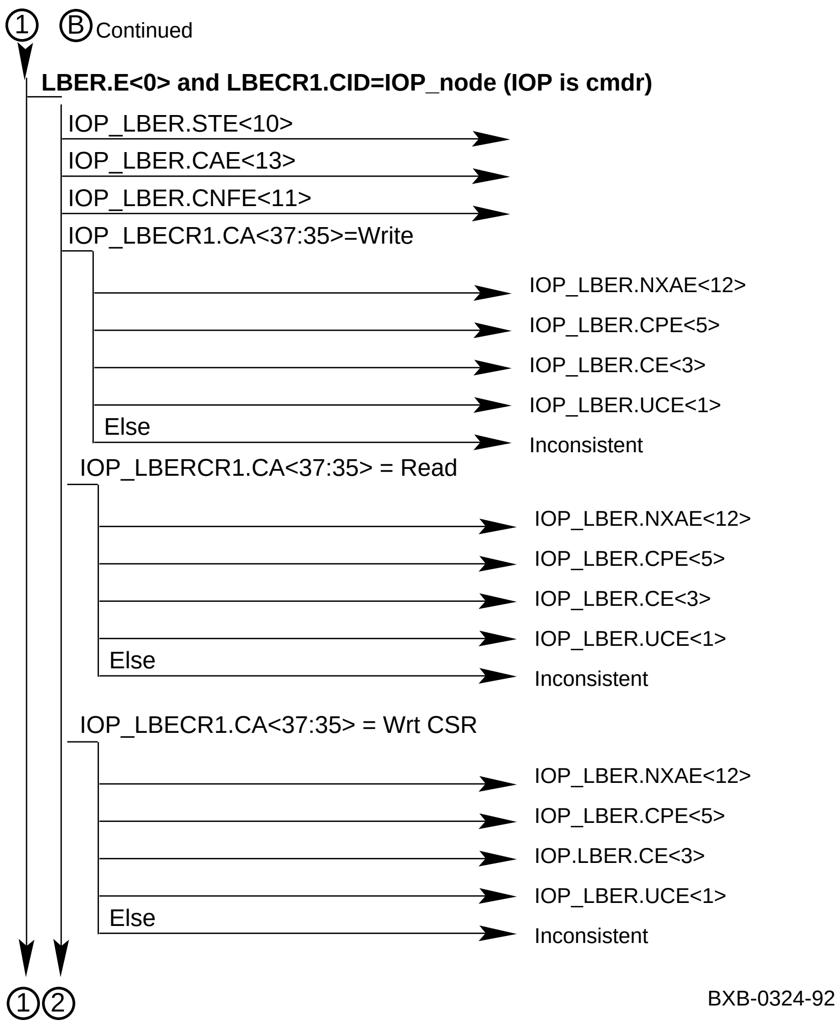


Figure 8-3 Hard Error Parse Tree (Continued)

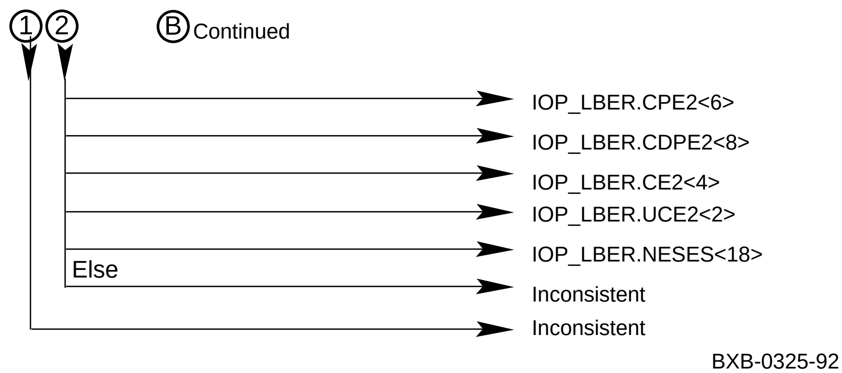
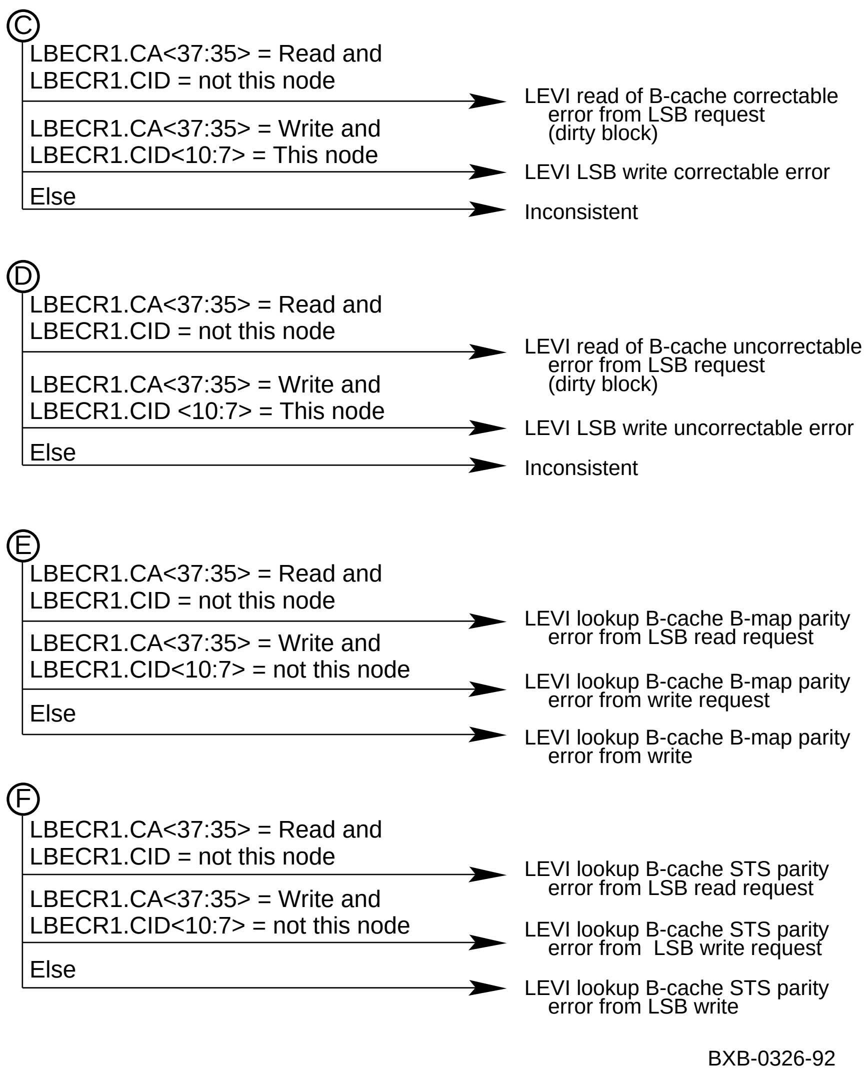
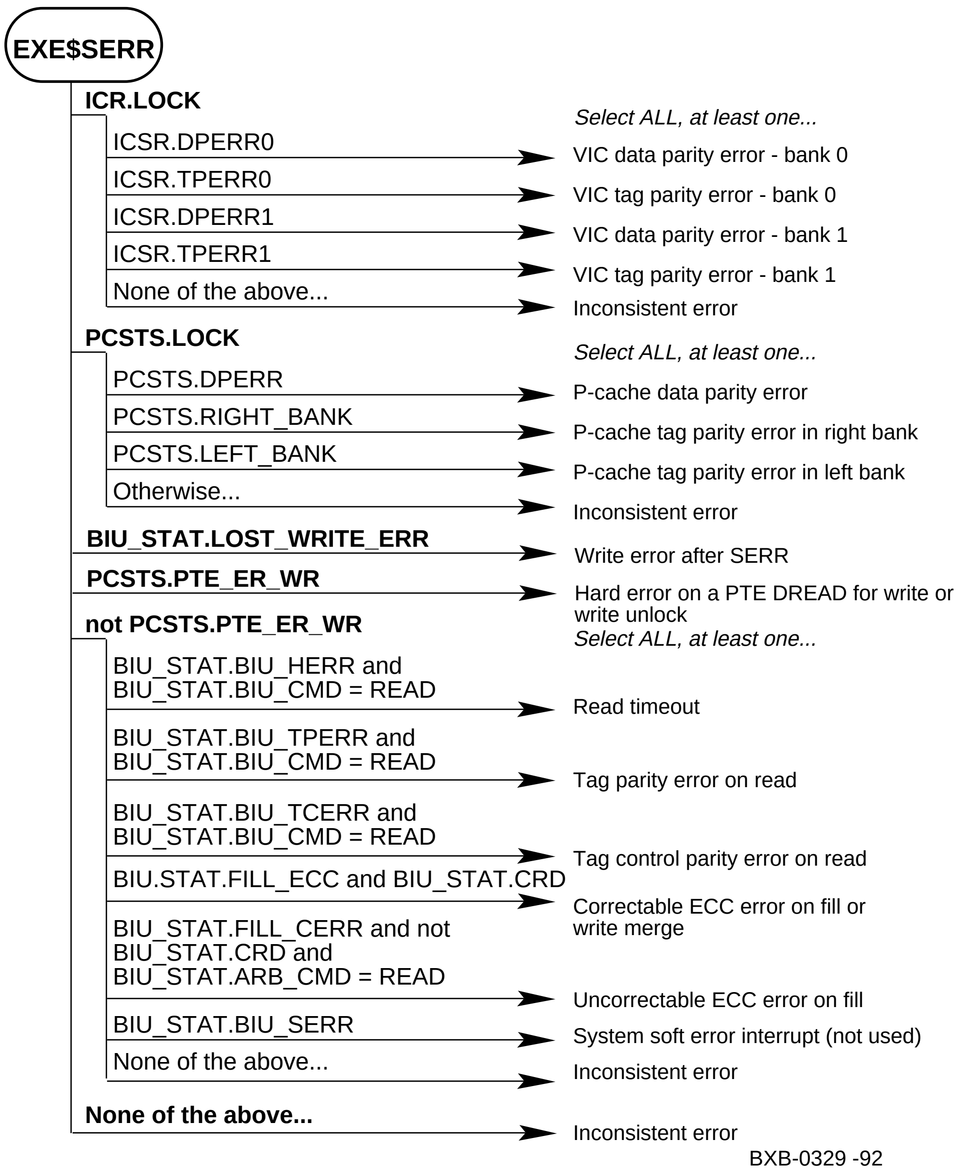


Figure 8-3 Hard Error Parse Tree (Continued)



8.4 Soft Error Parse Tree

Figure 8-4 Soft Error Parse Tree



8.5 I/O Port Parse Tree

Figure 8-5 IOP Parse Tree

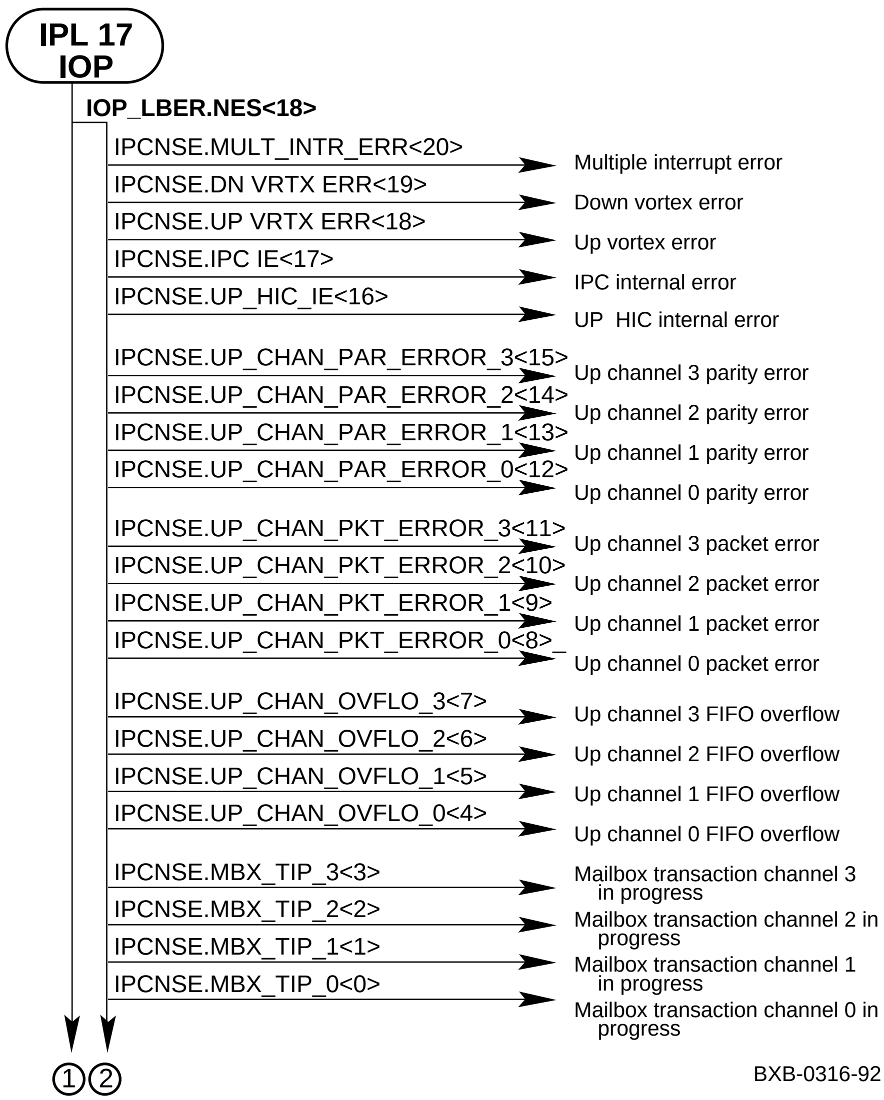
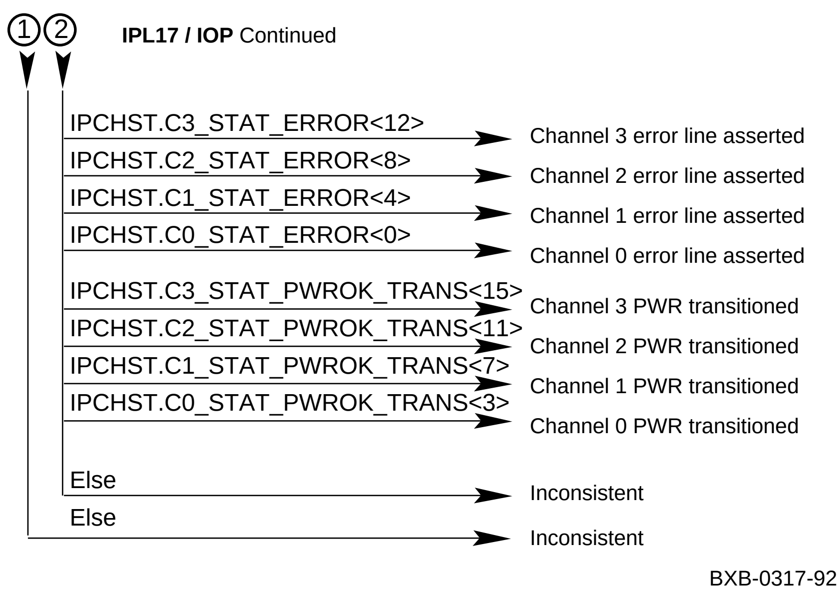


Figure 8-5 IOP Parse Tree (Continued)



8.6 DWLMA Parse Tree

Figure 8-6 DWLMA Parse Tree

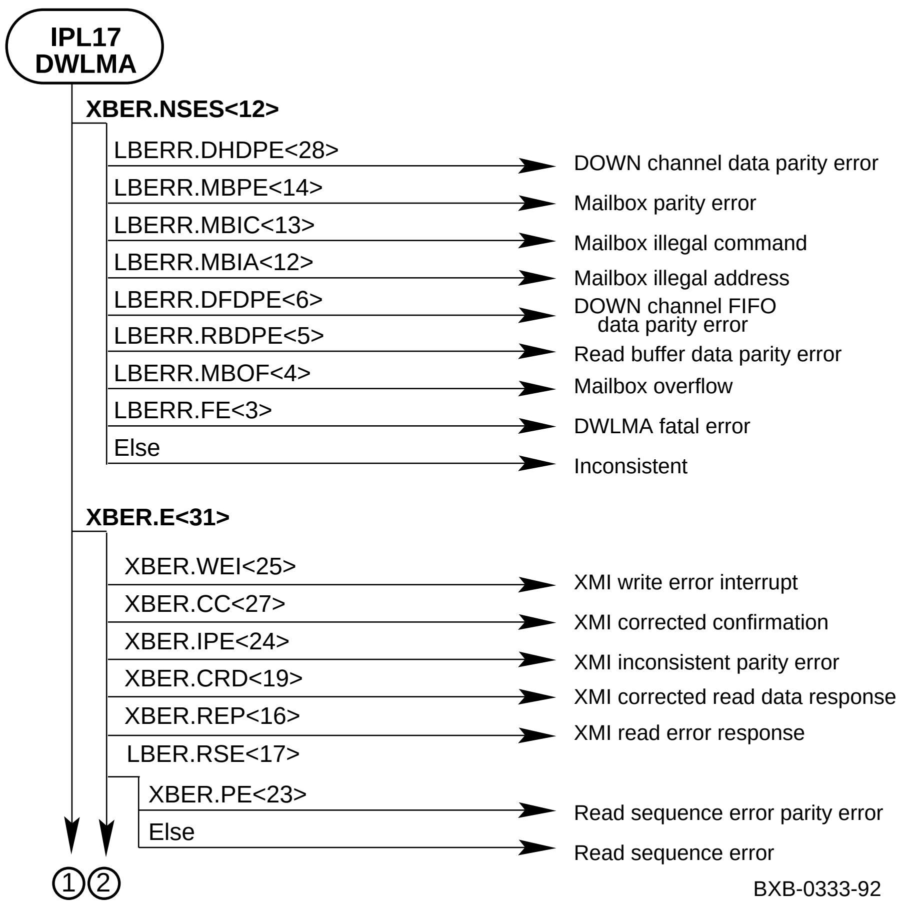
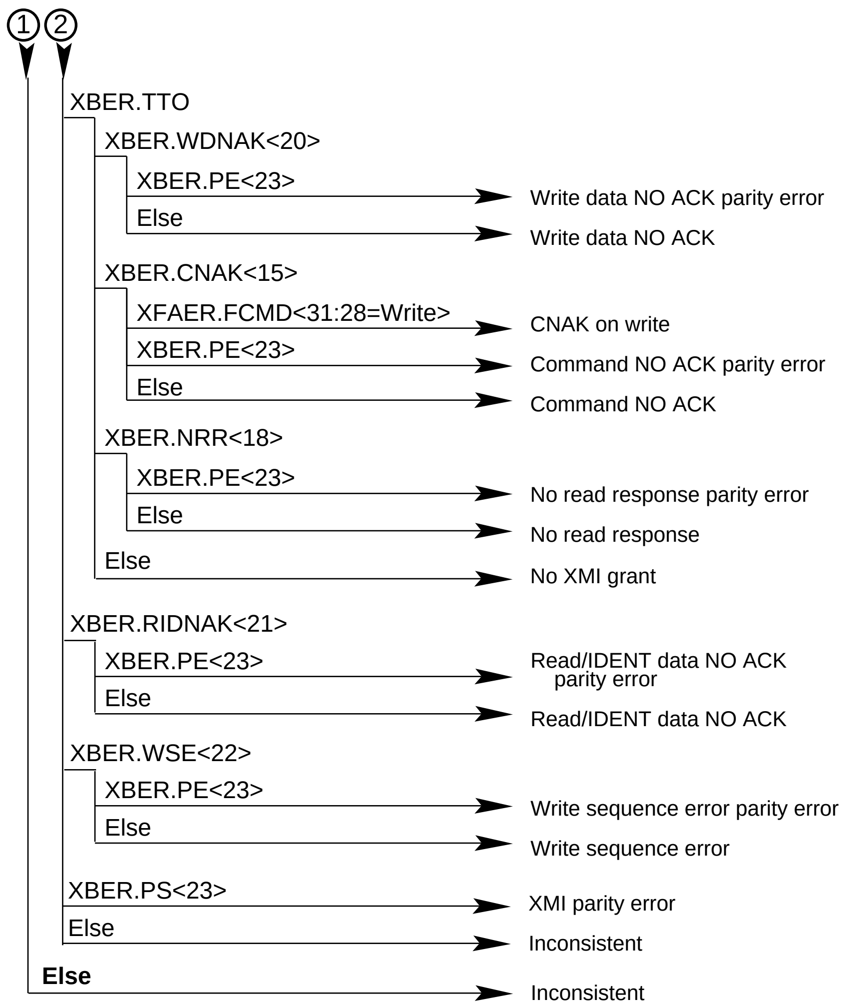


Figure 8-6 DWLMA Parse Tree (Continued)



BXB-0334-92

Index

R

S

T